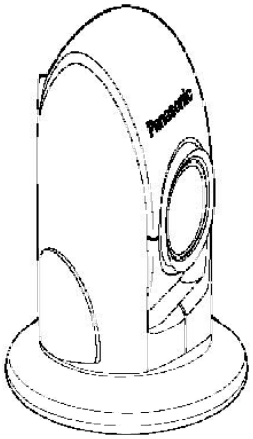
ORDER NO. KMS0505064CE

Service Manual

Network Camera

BB-HCM381CE / BB-HCM381E

(for Europe)



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IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING
If lead free solder was used in the manufacture of this product the printed circuit boards will be marked

PbF.
Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.
When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

1. ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.
We will use PbF when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).
This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB.
For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

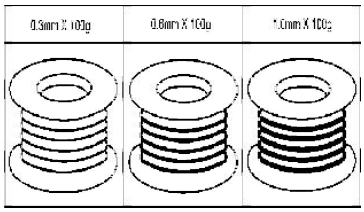
Caution

- **PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.**
- **PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).**
- **If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.**
- **When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).**

1.1. SUGGESTED PbF SOLDER

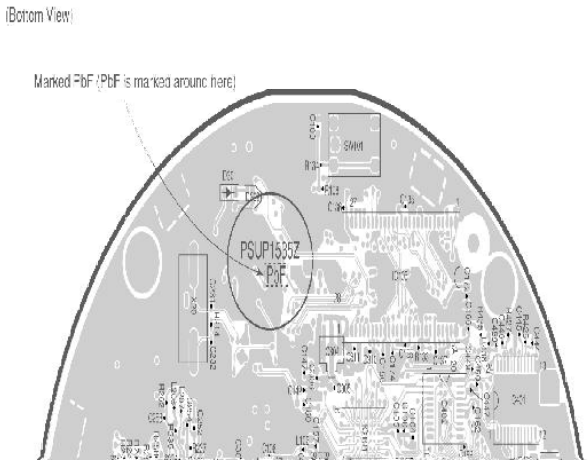
There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper,
(Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufac
turer's specific instructions for the melting points of their products and any precautions for using their

product with other
materials.
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.



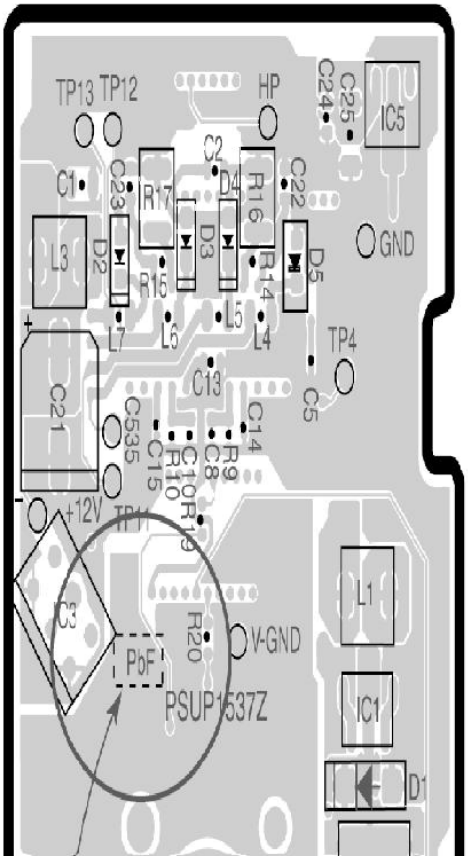
1.2. HOW TO RECOGNIZE THAT Pb FREE SOLDER IS USED

Main Board

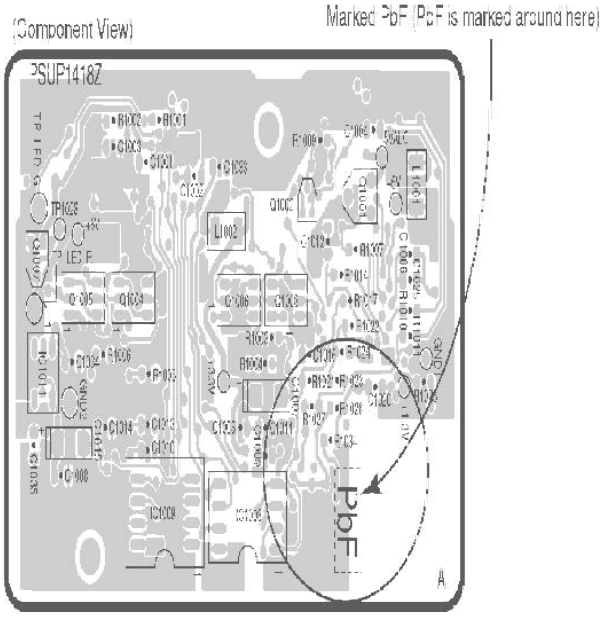


Tilt Board

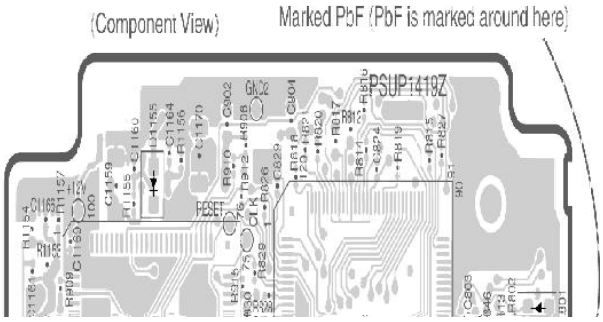
(Component View)



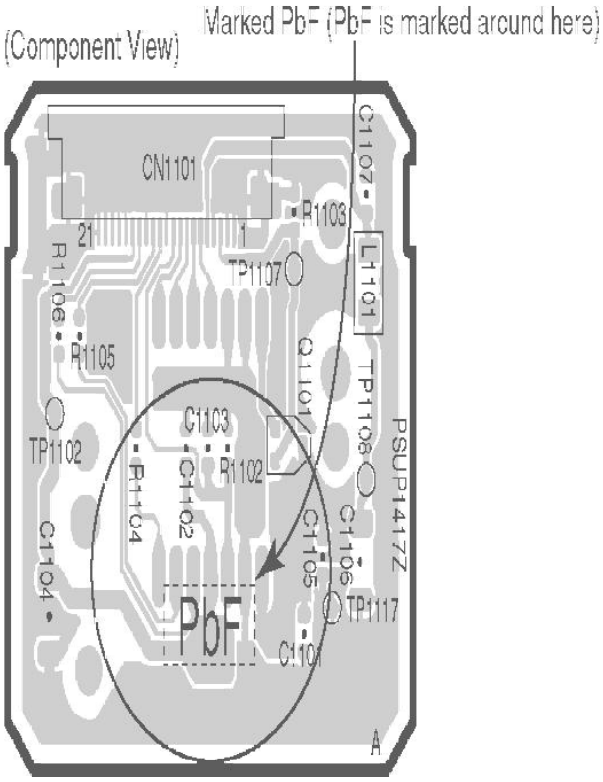
Lens Board



Video Board



CCD Board



I/O Board

2. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When replacing, the following precautions will help to prevent recurring malfunctions.

1. Cover the plastic parts with aluminum foil.

2. Ground the soldering irons.

3. Use a conductive mat on the work-table.

4. Do not grasp IC or LSI pins with bare fingers.

3. CAUTION

3.1. SAFETY PRECAUTIONS

1. Before servicing, unplug the power cord to prevent an electrical shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, make the following insulation resistance test to prevent a shock hazard.

3 VORSICHT

3.1. SICHERHEITSHINWEISE

1. Vor Reparaturen stets das Netzkabel abziehen, um Stromschlaggefahr zu vermeiden.
2. Aus Sicherheitsgründen ausschließlich vom Hersteller empfohlene Ersatzteile verwenden.
3. Den Zustand des Netzkabels prüfen und bei erkennbarer Abnutzung oder Beschädigung ersetzen.
4. Nach der Reparatur Kabelummantelung, Isolierschichten, Papierisolierung, Abschirmung usw. wieder anbringen.
5. Vor der Rückgabe des reparierten Gerätes an den Kunden die folgende Isolationswiderstandsprüfung durchführen, um ein Stromschlagrisiko auszuschließen.

3.2. BATTERY CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's Instructions.
The lithium battery is a critical component (type No. BR-2032-1VC). Please observe for the proper polarity an the exact location when replacing it and soldering the replacement lithium battery in.

3.3. TRADEMARKS

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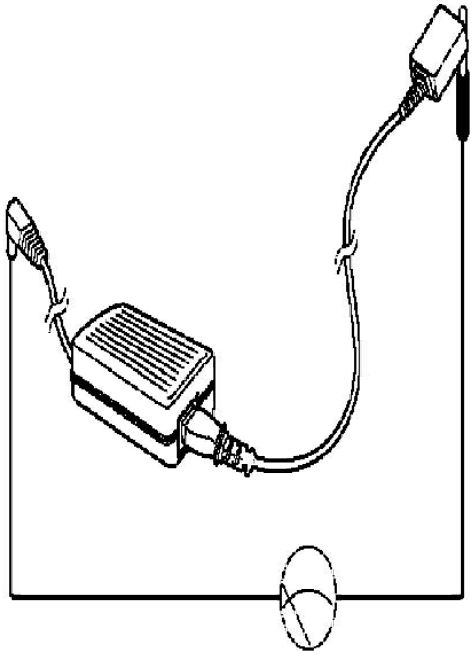
3.4. INSULATION RESISTANCE TEST

1. Unplug the AC power cord and short the two prongs of the plug with a jumper wire.
2. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw threads, etc.

Note:
Some exposed parts may be isolated from the chassis by design. These will read infinity.

3. If the measurement is outside the specified limits, there is a possibility of shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.



Ohm meter

Resistance = more than 1MΩ (at DC 500 V)

3.4. ISOLATIONSWIDERSTANDSPRÜFUNG

1. Das Netzkabel abziehen und die beiden Stifte des Steckers mit einer Drahtbrücke verbinden
2. Mittels eines Ohmmeters den Widerstand zwischen dem überbrückten Netzstecker und allen freiliegenden Metallteilen des Gehäuses wie Schrauben, Gewinde, usw. messen.

Hinweis:

Einige der freiliegenden Teile können konstruktionsbedingt vom Gehäuse isoliert sein. Diese ergeben dann unendliche

3.5. POWER CAUTION

The power socket wall outlet should be located near this equipment and be easily accessible.

3.6. PRECAUTIONS FOR USERS IN THE UNITED KINGDOM

FOR YOUR SAFETY, PLEASE READ THE FOLLOWING TEXT CAREFULLY.
This appliance is supplied with a moulded three pin mains plug for your safety and convenience. A 3 amp fuse is fitted in this plug. Should the fuse need to be replaced, please ensure that the replacement

fuse has a rating of 3 amps and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark **or the BSI mark** **on the body of the fuse.**

If the plug contains a removable fuse cover, you must ensure that it is refitted when the fuse is replaced. If you lose the fuse cover, the plug must not be used until a replacement cover is obtained. A replacement fuse cover can be purchased from yourlocal Panasonic Dealer.
IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE SOCKET OUTLET IN YOUR HOME THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY. THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT OFF PLUG IS INSERTED INTO ANY 13 AMP SOCKET.
If a new plug is to be fitted, please observe the wiring code as shown below. If in any doubt, please consult a qualified electrician.
IMPORTANT: THIS APPLIANCE MUST BE EARTHED.
How to replace the fuse: The wires in this mains lead are coloured in accordance with the following code:

Blue: Neutral
Brown: Live

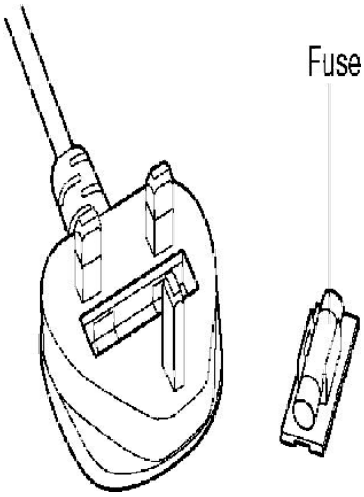
As the colours of the wire in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.
Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth symbol ⏚**.**

How to Replace the Fuse

1. Insert the flathead screwdriver into the groove either end of the fuse carrier.

2. Detach the fuse carrier and change the fuse.



3. Replace the fuse into the fuse carrier and resecure into the mains plug.

3.7. CLEANING

After the camera is turned off by disconnecting the AC plug, clean the camera.

4. SPECIFICATIONS

Network Camera Specifications

Item	Description
Zoom	12 steps, 42x (21x Optical Zoom, 2x Digital Zoom)
Pan/Tilt Angle	Pan: -175° to +175°, Tilt: -120° to 0° (On the table) /0° to +90° (On the ceiling)
Sensor Type	1/4 type CCD (Interlace type), 380,000 pixels (Effective Pixels)
Illumination	3-100,000 lx (0.09-100,000 lx when in color night view mode)
White Balance	Auto/Manual/Hold
Focus	Auto/Manual (40 steps)
Zoom	12 steps of 42x Zooming (21x Optical Zoom, 2x Digital Zoom)
Minimum Object Distance	Wide: 5 mm (0.2 inches) Tele: 1 m (40 inches)
Caliber Ratio (F No.)	Tele: F1.6-Wide: F3.6
Horizontal Viewing Angle	Tele: 2.6° (Optical)/1.3°(Digital), Wide: 51°
Exposure	Auto

Other Specifications

Item	Description
Video Compression	JPEG/3 Levels
Video Resolution	640 x 480, 320 x 240 (default), 160 x 120
Buffered Image *1	About 125 frames (320 x 240) with time display (SD memory card is not inserted.)
Audio Communication	2-way Half Duplex
Audio Bandwidth	300 Hz-3.4 KHz
Audio Play Method	Play with ActiveX
Input Encoding Method	Encoding with ActiveX
Audio Input *2	3.5 mm Mini Jack
Audio Output *2	3.5 mm Stereo Mini Jack (output is mono), Line Level
Frame rate *3	Max. 12 frames/second (640 x 480) Max. 30 frames/second (320 x 240 or 160 x 120)
Supported Protocols	IPv4/IPv6 Dual-Stack -IPv4: TCP, UDP, IP, HTTP, FTP, SMTP, DHCP, DNS, ARP, ICMP, POP3, NTP, IPsec, UPnP -IPv6: TCP, UDP, IP, HTTP, FTP, SMTP, DNS, ICMPv6, POP3, NDP, NTP, IPsec
IPsec Feature	ESP Encryption, ESP Authentication Transport mode/Tunnel mode IKE (Internet Key Exchange)
IKE (Internet Key Exchange)	Pre-Shared Key
Cipher Algorithm	DES-CBC, 3DES-CBC, AES-CBC
Message-Digest Algorithm	HMAC-MD5, HMAC-SHA-1
Message Transfer Condition	Alarm or Timer
Image Transfer Method	SMTP, FTP
Interface	10Base-T/100Base-TX Ethernet RJ-45 connector x1
Indicator Display	Power/Network Communication/Camera operation/Ethernet link
External I/O	External Sensor Input x 2 External Sensor Output x 1
SD Memory Card Slot	Full Size
Dimension (HWD)	140 mm (5.51 inches) x 123 mm (4.84 inches) x123 mm (4.84 inches)
Weight	640 g (1.41 lb.) (Only the unit)
Power Supply	AC adaptor: Input 100-240 V AC, 50/60Hz Output 12 V DC, 1A Consumption: About 12 W
Temperature	Operation: 0°C (+32°F) to +40 °C (+104 °F) Storage: 0°C (+32 °F) to +50 °C (+122°F)
Humidity	Operation: 20 %~°80 % (No Condensation)Storage: 20 %~80 % (No Condensation)
Setting Angle	Available between ±15° based on level line for mounting both on the table and on the ceiling.

***1) The maximum number of frames changes depending on the image quality and what object you**

buffer.
***2) Use only the included Audio/Video Cable when connecting an external microphone, speaker, or TV.**
***3) Frame rate may slow down depending on the network environment, the PC performance, the image quality, enabling IPsec, SD memory recording or what object you view.**

5. MAIN FEATURES

IPv6*1 Network Camera
Your Panasonic Network Camera supports IPv6 (Internet Protocol Version 6), IPv6 was created to address the additional IP addresses that will be needed as the Internet continues to expand. Since the camera also supports IPv4 that's currently used, it is "dual stack" design will seamlessly operate while IPv6 is phased in. For more information in IPv6 you wish to visit http://www.ipv6.org/. See page 15 for more information.

Audio 2-way Communication*2 (Walkie-talkie Type)
2-way audio communication is now possible between your Network Camera and PC. By connecting a user-supplied microphone and speaker *3 to both the camera and to the PC, you will be able to speak to and hear anyone within range of the camera.
For example, the camera can be used in the following various locations:

- **In the baby's room, to hear if the baby is crying.**
- **At the front door, to see and hear who is at the door.**
- **In the children's play room, to see and hear if they are safe.**

Note:
PLEASE NOTE that under certain circumstances, audio/video recording may be PROHIBITED by law. This device should be used only in compliance with all applicable federal, state and local statutes.

Better Image Quality
The CCD sensor and the color night view mode provides better image quality and low light performance.

- **The CCD sensor gives you clear image.**
- **You can monitor live video (Motion JPEG) that refreshes its image 30 frames per second.**
- **Color night view mode allows you to monitor the camera in low illuminance.**

Remote Pan/Tilt/Zoom/Focus
The following features allow you to operate Network Camera from web browser on your PC. High speed Pan/Tilt operation can move the lens horizontally from -175° to +175° and vertically from -120° to 0° in mounting on the table and from 0° to +90° in mounting on the ceiling. This movable lens allows you to view a wide range of perspective from a distant place. Network Camera has a 42x magnifying capacity: a 21x optical zoom and a 2x digital zoom. Automatic and Manual Focusing features provide you with detailed and distinct images. Additionally, the following control features are available to easily and quickly monitor the camera.

Click to Center ..... When you click a certain point on the camera image, the point is centered on the image.
Preset Position ..... You can register 8 preset positions. When you click each button, the image switches to its position.
Output Control ..... You can control the external devices (Open or Short to GND) (E.g., turning the light on or ringing a buzzer).

Video Output
Network Camera has an analog composite output terminal. You can view images from Network Camera on TV and record them on videotapes.

SD Memory Card *4 Recording
The camera has an SD memory card slot. You can record camera images to the SD memory card. If you enable alarm buffer/transfer, you can record the image at the timing of signal detection of door sensor or light. About 58,000 images (320 x 240 resolution and standard quality) can be recorded to 1 GB SD memory card. If you enable 1-minute interval timer buffer/transfer, you can record the images for about 41 days.

Enhanced Multi-Camera Page
Multi-Camera page displays up to 4 cameras while supporting each audio 2-way communication. The previous model displays only 4 cameras, but this camera can switch 3 sets of 4 cameras. Additionally, the camera can displays maximum 12 cameras on a page in a static image.

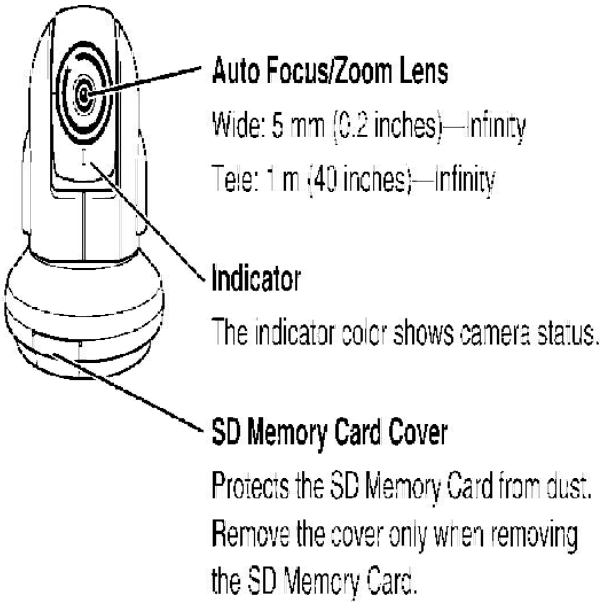
Supporting Viewnetcam.com service
Viewnetcam.com service allows you to access the camera over the Internet with your favorite domain name (e.g. bob.viewnetcam.com) instead of a global IP address.

Multi-Language Display
Top page, Single Camera and Multi-Camera page can be displayed in English, French, German, Italian, Spanish, Russian, Simplified Chinese or Japanese. The Setup, Maintenance and Support pages are displayed only in English or Japanese.

***1) To connect in IPv6, subscribe to the ISP's "IPv4/IPv6 Dual-Stack" or "IPv6 over IPv4 Tunneling" service. The camera does not work in IPv6-only network.**
***2) Audio feature does not work well on cell phones. Talk button and Listen button cannot be used simultaneously. In consequence of traffic and network environments, the audio may be delayed or may break up.**
***3) The speaker connected to the camera requires a built-in amplifier.**
***4) SD memory card is sold separately. The camera supports 1 GB, 512 MB, 256 MB, 128 MB or 64 MB Panasonic SD memory card.**

6. PARTS LOCATIONS

6.1. FRONT VIEW

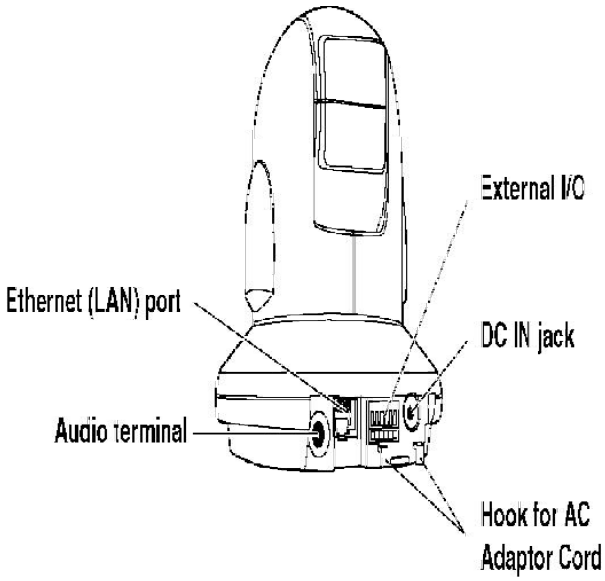

Auto Focus/Zoom Lens
Wide: 5 mm (0.2 inches)—Infinity
Tele: 1 m (40 inches)—Infinity
Indicator
The indicator color shows camera status.
SD Memory Card Cover
Protects the SD Memory Card from dust.
Remove the cover only when removing
the SD Memory Card.

Indicator

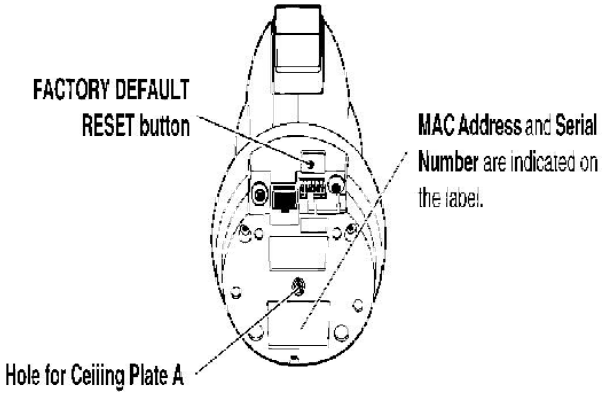
Power on	**Not on the LAN**	**Orange blinking**
	On the LAN	**Orange blinking → Green blinking Green**
Normal Operation *1		**Green**
Automatic Setup	**Setting**	**Green blinking**
	Finished setting	**Green blinking → Green**
Using DHCP	**Getting IP address *2**	**Green blinking**
	Got IP address	**Green**
Updating Firmware		**Orange blinking**
Pressing FACTORY DEFAULT RESET button		**Orange blinking Turning off (The camera restarts after that.)**
UPnP Failure		**Orange blinking (About a 2-second interval)**
Internal Failure		**Red blinking**

*** 1) The indicator turns orange if the camera is not connected to the LAN.**
*** 2) The indicator blinks orange if the camera is not connected to the LAN.**

6.2. REAR VIEW



6.3. BOTTOM VIEW



7. CONNECTING YOUR NETWORK CAMERA

7.1. PREPARATION

Prepare the following before connecting the Network Camera.

- PC to fulfill the system requirements.

SYSTEM REQUIREMENTS

The PC (Personal Computer) and the network must meet the following technical specifications for the Network Camera to work properly.

Item	Description
Operation System	Microsoft ® Windows ® 98SE operating system Microsoft ® Windows ® 2000 operating system Microsoft ® Windows ® Me operating system Microsoft ® Windows ® XP operating system
Network Protocol	TCP/IP network protocol installed. (HTTP, TCP, UDP, IP, DNS, ARP, ICMP)
Interface	10/100Mbps Ethernet ® card for your network connection
Web Browser	Internet Explorer 6.0 or later (Not included on the Setup CD-ROM).

Note:
Pentium ® II 300 MHz or greater CPU is recommended to prevent performance degradation.

- Ethernet switching Hub or wireless Router for LAN Connection.
- Ethernet cable (two pieces of Category 5 straight cable, or a piece of Category 5 cross cable).
- Setup CD-ROM
The setup program simplifies Network Camera installation. Adobe Acrobat ® Reader 4.05 or later enables you to see the Operating Instructions on the Setup CD-ROM. If Adobe Acrobat Reader is not installed on the PC, double-click "ar405eng.exe". Refer to "ReadmeEng.txt" for the directory and file structure ofthe Setup CD-ROM.

Note:
- Do not scratch, smudge, write or label either surfaces of the Setup CD-ROM. Setup CD-ROM may have a scratch on the surface.
- Do not leave the Setup CD-ROM in direct sunlight, near a heat source or in a hot automobile as the Setup CD-ROM may become unreadable.
- Do not use chemicals or cleanser to clean the Setup CD-ROM as the Setup CD-ROM may become unreadable.

The display color quality
To insure the images you are viewing are the best they can be, set the Display property setting (color quality) to 24 bit or highher. Follow the next steps.

1. Close all applications so that you are looking at the Windows desktop.
2. Right-click an open portion of the desktop.
3. Select [Properties], [Setting] tab, and set [Color Quality] (Colors/Color

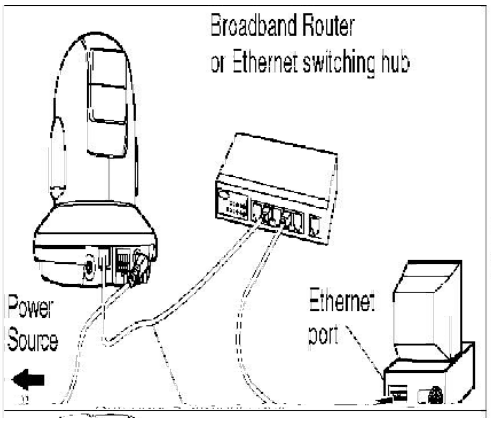
Pallet) to the highest selection possible.

Note:
Optimum video viewing will be seen when the color quality is set to 24bit or higher. This change should not cause any problems with other applications on your PC.

7.2. CONNECTING THE NETWORK CAMERA

When checking the operation of the network camera, set up a configuration to be either of the two connecting patterns described below. For a configuration to be set up when connecting to the Internet, refer to the Operating Instructions.
Use Category 5 cross cable when connecting directly to the PC.

7.2.1. Wired Connection



Hub
Connection

7.3. NETWORK CAMERA SETTING

To access the network camera from a PC under the 6.2. CONNECTING THE NETWORK CAMERA, it is required to make the network settings of the PC consistent with those of the network camera.
Using the setup CD-ROM, search the information from the PC about the network settings of the network camera. Make the settings (IP address and subnet mask) of the network camera consistent with those

of the PC.

- Do not select establish the DHCP and DDNS about settings of the network camera and PC.

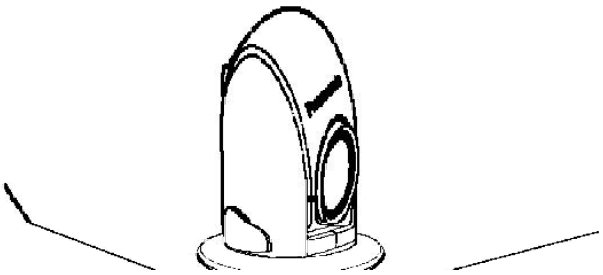
For more detailed information, refer to the Operating Instructions.

8. MOUNTING

Two ways of mounting are shown in the following figures. MAC Address and Serial Number are indicated on the bottom label of the main unit of the Network Camera. Please record both of them on the Network Camera Memo on Operating Instruction. They are indispensable for setting network parameters after mounting the Network Camera and for future customer servicing.

8.1. MOUNTING ON THE TABLE

Mount the Network Camera at an even place where vibrations etc. are few.



Note:
If this camera is installed in a commercial or industrial building, local building code may require specific installation methods to be used. In such cases we strongly suggest that you contact your local building inspector so that the installation complies with any applicable building code.

8.2. MOUNTING ON THE CEILING

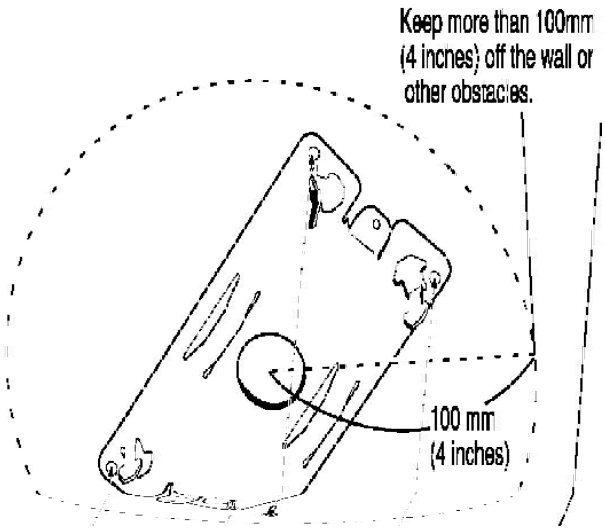
Please set the Tilt range to [On the ceiling] on Camera Setup window on Operating Instruction. Two ways of wiring can be considered; wiring through a hole made in the ceiling or wiring without making a hole for a cable in the ceiling. Please select either one of the two.

Wiring through a hole made in the ceiling

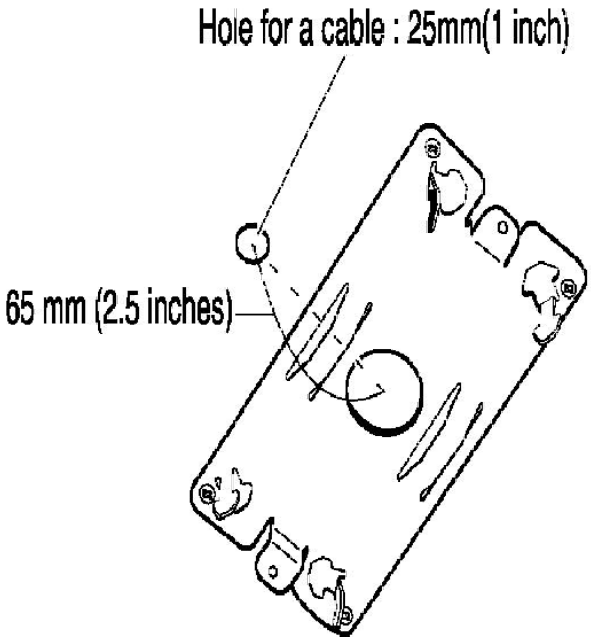
1. Fix the Ceiling Plate B on the ceiling with Screws B.

- Fix the Ceiling Plate B more than 100 mm (4 inches) off the wall or other obstacles from its center.

- Make sure the Network Camera is firmly mounted on a beam of wood etc. When there is no beam, apply a board on the other side of the ceiling to make sure the Network Camera does not drop.



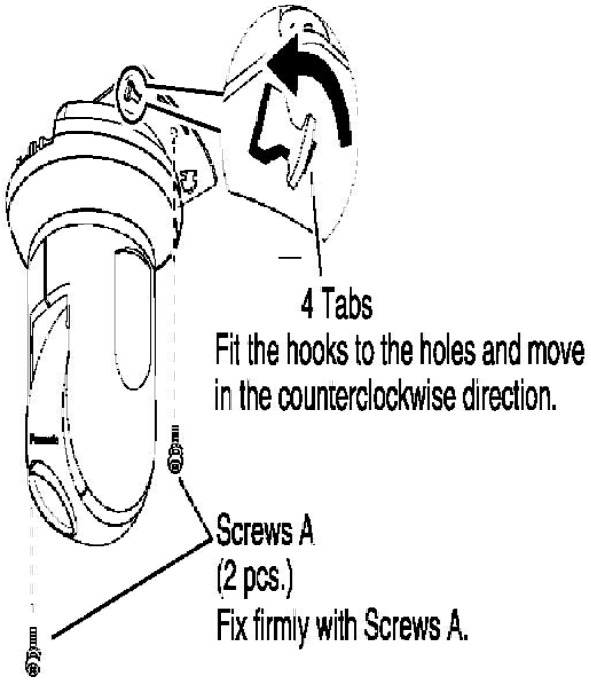
2. Make a hole for a cable.



3. Fix firmly the Ceiling Plate A on the bottom of Network Camera.

- Make sure the Network Camera, using coins etc., is firmly fixed.

4. Fix the Ceiling Plate A to the Ceiling Plate B and fix them firmly with Screws A.



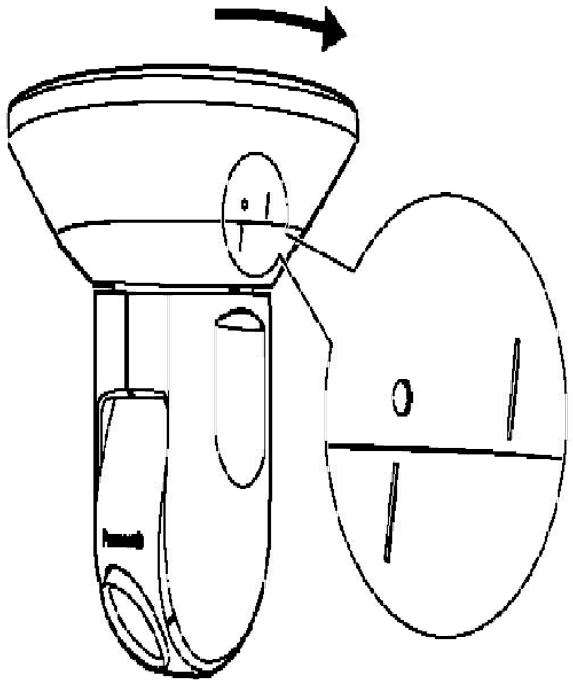
5. Connect the cable and fix the Ceiling Mounting Cover. Adjust the "I" of the Ceiling Mounting Cover to the "I" of the main unit.

- Be careful not to nip the cable etc.

6. Move the Ceiling Mounting Cover in the clockwise direction until the "I" of it fits to the " " of the

main unit.

- When removing the Ceiling Mounting Cover, move it in the counterclockwise direction. Adjust both "I" and let down the main unit.



Wiring without making a hole for a cable in the ceiling

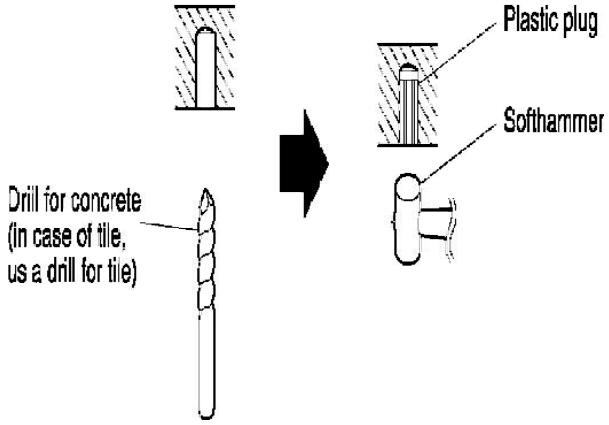
- Please follow the steps 1), 3), 4), 5), 6). Making a hole is not necessary.

- Please remove the tab of Ceiling Mounting Cover and wire through the notch.

A Ceiling Mounting example (Making holes on mortar wall)

1. Fit the Ceiling Plate B to the mounting position and put marks.

2. Make holes at the marks and put plastic plugs (customer provided) into them.



Note:
Mortar wall is easy to come off in drilling.

3. Mount the Network Camera.

Note:
If this camera is installed in a commercial or industrial building, local building code may require specific installation methods to be used. In such cases we strongly suggest that you contact your local building inspector so that the installation complies with any applicable building code.

9. DISASSEMBLY INSTRUCTIONS

9.1. DISASSEMBLY INSTRUCTIONS (MAIN BOARD AND I/O BOARD)

1. Remove three Screws (C). And remove the Cabinet Cover.	

2. Remove the Screw (B). And remove the I/O Board.	

3. Remove the Lead Wire and the two FFCs from the Connectors. **4. Remove three Screws (B). And remove the Main Board.**	

9.2. DISASSEMBLY INSTRUCTIONS (TILT BOARD)

1. Remove the two Pan Screw Covers. **2. Remove four Screws (A1), and remove the two Pan Covers.** **Caution:** **When remove Pan Screw Covers, please use the tools not to injure the Jig as illustrated in the figure and Pan Screw Covers.**	
3. Remove two FFCs, FPC and Lead Wire from the Connectors. **4. Remove two Screws (A2).**	

9.3. DISASSEMBLY INSTRUCTIONS (VIDEO BOARD, LENS BOARD AND CCD BOARD)

1, 2 are same as 9.2. DISASSEMBLY INSTRUCTIONS (TILT BOARD).

3. Remove eight Screws (A).	
4. Remove the Upper Tilt Cover. And remove the Lower Tilt Cover.	

5. Remove the FFC (1), FFC (2) and FPC from the Connector. **6. Remove two Screws (A). And remove the Video Board.** **7. Remove two Screws (B). And remove the Lens Board.** **8. Remove two Screws (36-4). And remove the CCD Board.**	

9.4. DISASSEMBLY INSTRUCTIONS (CCD UNIT)

1. Remove the Tilt Board Spacer. **2. Remove two Retaining Rings and three Spacers.** **3. Remove Tilt Block Ass'y (Camera Unit) to under direction.**	

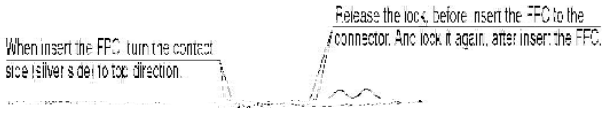
4. Remove the Tilt Belt.	
5. Remove the Tilt Block Ass'y (Camera Unit).	

6. Remove four Screws (A1). And remove the Tilt Gear.	
7. Remove two Screws (A2). And remove the Upper Tilt Cover and the Lower Tilt Cover. **8. Remove the Lens Cover.** **9. Remove the FPC (1) from the Connector. And remove the Cable Guide.**	

10. Remove the FFC (1) and FFC (2) from the Connector. **11. Remove two Screws (B). And remove the Lens Board.** **12. Remove two Screws (A3). And remove the Video Board.** **13. Remove three Screws (E). And remove the CCD Unit from the Lens Guide Ass'y.**	

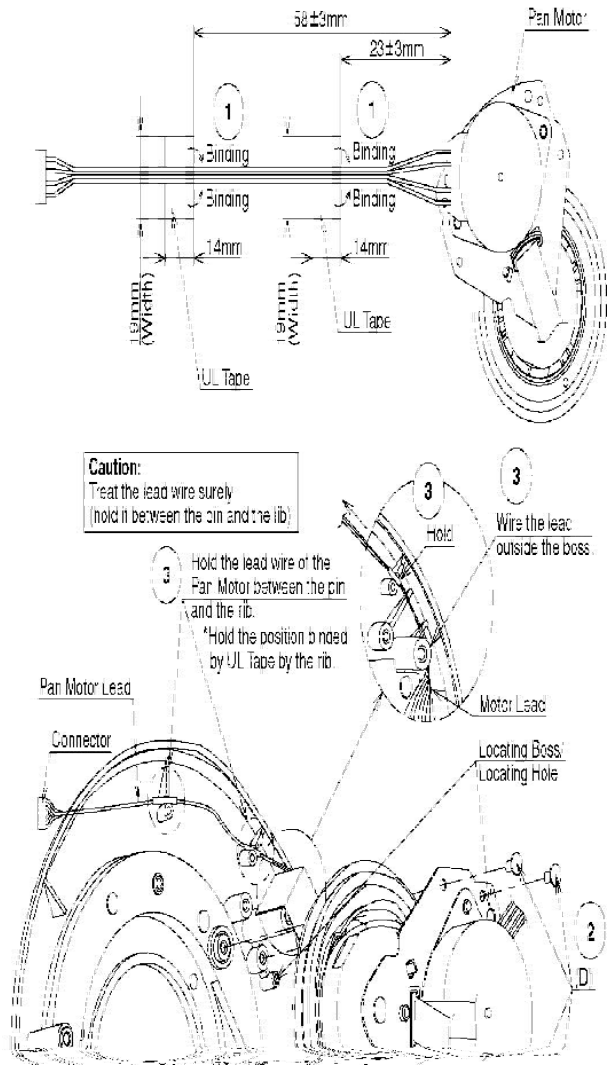
10. THE CAUTIONS AT THE TIME OF ASSEMBLY

10.1. FFC (VIDEO-CCD)


When insert the FPC, turn the contact
Release the lock, before insert the FFC to the
connector. And lock it again., after insert the FFC.

10.2. LEAD WIRE

1. **Bind two position of the Pan Motor lead to measure as illustrated in the figure.**
2. **Fix the Pan Motor, and (D) four parts securely.**
   Caution:
   Through the locating pin of the cabinet to the locating hole.
3. **Wire the lead of the Pan Motor as illustrated in the figure.**



10.3. FFC

1. Infold the wide size FFC (21P). (once)

Caution 1:

Mind the way of infolding.

2. A Core Cushion is wound around a Filter and stuck.

Caution 2:

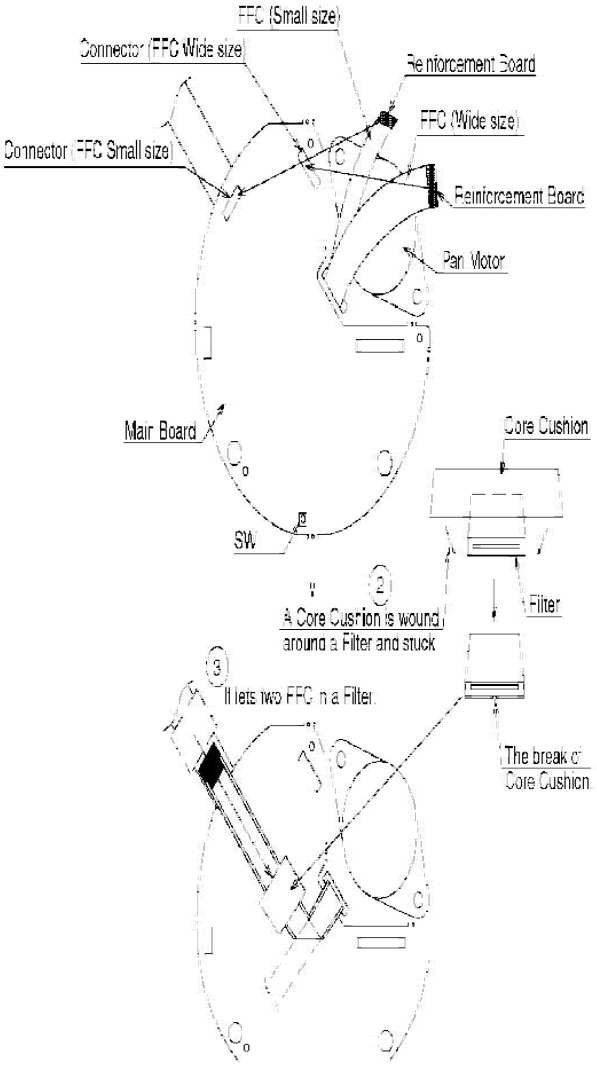
The Filter has not overflowed a Core Cushion.

3. It lets two FFC in a Filter.

Caution 3:

In case you let a FFC, a Filter turns a field without the break of a Core Cushion up.

4. **A hook of a Core Stopper is caused and it hooks on a Filter.**



10.4. FFC SHEET

1. Pass both FFCs through the FFC Sheet as shown, and insert A into B.

Caution 1:

Insert all the way to the FFC Sheet.

2. Attach Tilt Board Spacer.

Caution 2:

Insert the pin on the front of the Tilt Board Spacer into the hole as shown.

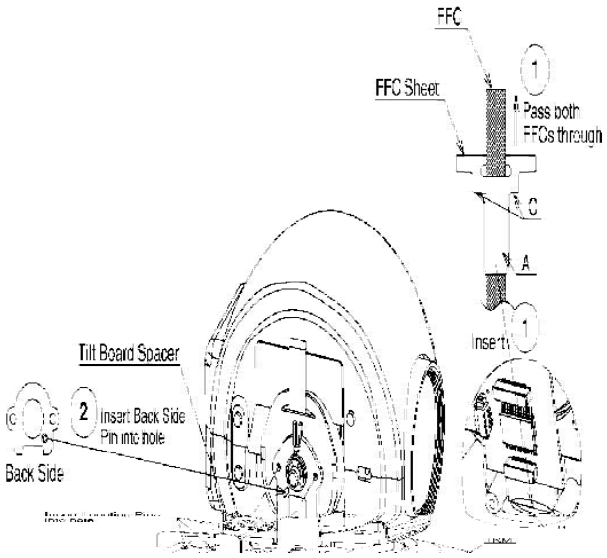
3. Attach Tilt Board and secure with 2 Screws as shown.

Caution 3:

Insert the Locating Pins into the Locating Holes as shown.

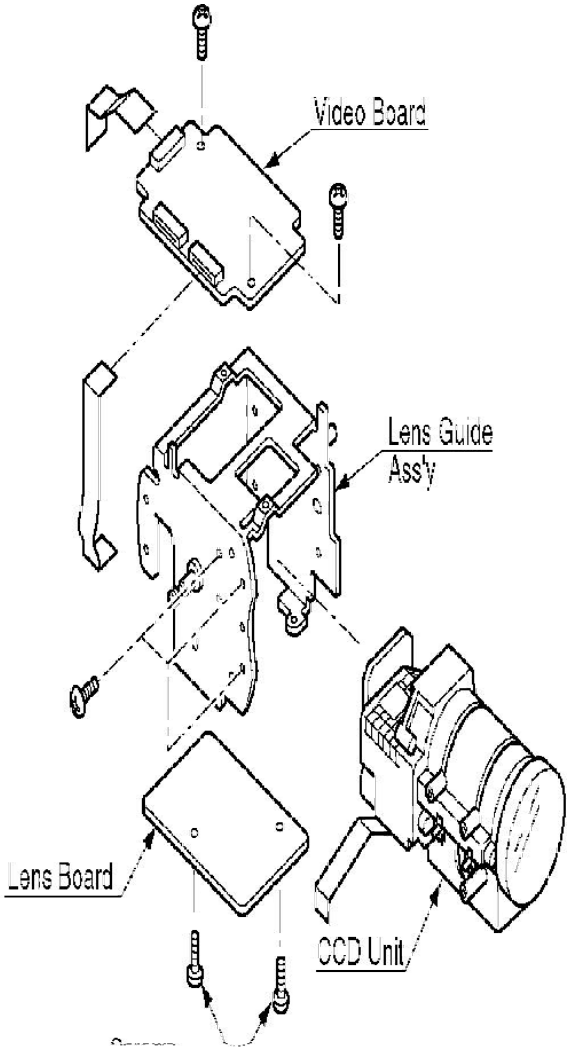
Caution 4:

The FFC Sheet will stick out from behind the bottom of the Tilt Board as shown.



10.5. LENS BOARD

When fix Lens Board by the Screws, please use the jig not to shift Lens Guide Ass'y.



10.6. CCD UNIT

1. **Affix the LPF, CCD Rubber, and CCD Board (in that order) to the Lens Unit, and secure using 2 Screws.**

Caution 1:

Before assembling, remove dust from the inside of the lens as shown.

Caution 2:

Line up the top and bottom of the Lens Unit and CCD Board as shown.

Caution 3:

Insert the locating pins of the Lens Unit into the locating holes of the CCD Board as shown.

Caution 4:

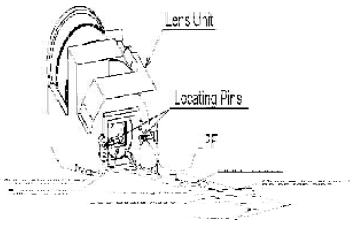
The CCD Rubber can be affixed in any direction. LPF is no inside and outside.

Caution 5:

Inspect the LPF and the surface of the CCD glass with a magnifying glass, and remove any dust before assembling.

Caution 6:

After assembling, lightly shake the Lens Unit. If you hear no rattling, the parts have been assembled securely.



11. ADJUSTMENTS

11.1. TOOLS AND EQUIPMENT FOR ADJUSTMENT AND REPAIR

(1) HP light box

- Light Box [with Standard Accessories]: VFK1164TDVLB
- Lamp [for Light Box]: VFK1164LA02
- Color Chart: VFK1164TDVCB
- Color Temp. Conversion Filter for 5100K: VFK1164LBB12
- ND Filter: VFK1164ND06
- Collimator (Infinity Adjustment Lens)[with Focus Pattern Chart]:

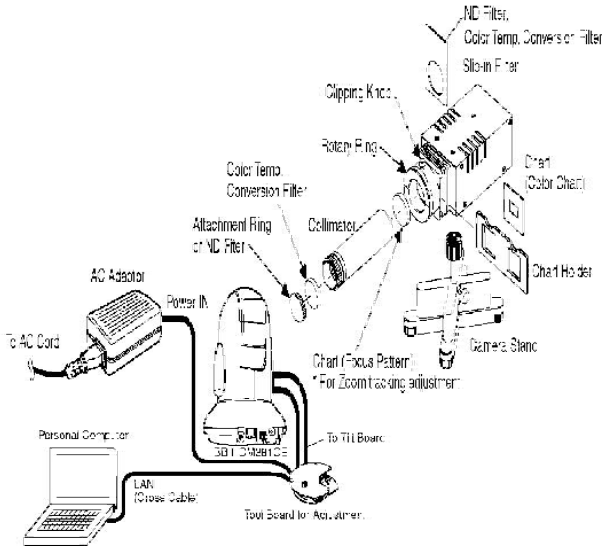
VFK1164TCM02

- Attachment Ring: 46mm

(2) LAN Cable [Cross]
(3) Personal Computer
(4) AC Adaptor: Part No. PSLP1242
(5) HCM PTZ CAMERA Service Tool
(6) DC power supply
(7) Camera stand
(8) Tool Board for Adjustment

11.2. PREPARATION

- Cable Connection



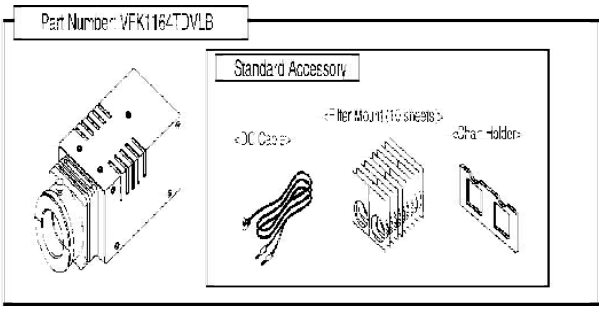
Tools and Equipment which need for each adjustment

	Zoom Tracking	IRIS	VIDEO
(1) Light Box (with Lamp)	**O**	**-**	**O**
-Color Chart	**-**	**-**	**O**
-Focus Pattern Chart	**O**	**-**	**-**
-Color Temp. Conversion Filter for 5100K	**-**	**-**	**O**
-ND Filter	**O**	**-**	**-**
-Collimator (Infinity Adjustment Lens)	**O**	**-**	**O**
-Attachment Ring	**O**	**-**	**O**
(2) LAN Cable	**O**	**O**	**O**
(3) Personal Computer	**O**	**O**	**O**
(4) AC Adaptor	**O**	**O**	**O**
(5) HCM PTZ CAMERA Service Tool	**O**	**O**	**O**

Note:
Collimator must be inserted all the way into light box until reaching stop point.

11.3. HP LIGHT BOX (High-Precision)

This light box enables the improvement of adjustment accuracy from a previous light box.



Features

1. **Hight-Internesity Luminance and Long Life Made Possible by New Halogen Lamp (20W / DC12V)**
   Luminance:=1,900 cd/m2 ≒ iLuminance conversion:5,900lux) (compared with conventional models: 2.4 times)
   Life: Over 1,000 hours (Rate compared with conventional modela: Over 10 times)
2. **Compact Desing**
   Specific volume compared with conventional models: Approx.65% (Not including camera stand)
3. **Attachment of Collimator (Collimator: Infinity Adjustment Lens)**
   It is possible to screw up a collimator to the Light Box. And it is very easy to compensate for the slant(shear of the optical axis) caused by the weight of the collimator itself.
4. **Attachment of Chart and Optical Filters**
   For easy and quick replacement to the charts, the light box is equipped with the slot and the chart holder. Also, it is equipped with the slota for optical filters, one for color temperature conversion filters, one for cokor compensation filters. It is very convenient to set up for a color condition according to adjustment procedure.
5. **Integrated Cooling Fan**
   To prevent the tempereture from rising inside the Light Box and to extend the life of the lamp, it is equipped.

<Specifications>

Size:	**90mm (W)~197.5mm (D)~70mm (H)**
Weght:	**750 g**
Power Supply :	**External DC regulated power supply (DC more than 2A)**
Lamp:	**DC12V 20V halogen lamp (Life: 2,000 hours)**
Luminance:	**1,900 cd/m² ±100 cd/m² (center of the emission face) (iluminance conversion: ≒5,900 lux)**
Homogeneity :	**Within ±10%**
Color temperatur:	**3,100 K ±100K (center of the emission face)**
CIE chromaticity coordinate:	**X = 0.430 ±0.02 y = 0.400 ±0.02**
Internal filter:	**LB60 + M50 (modifited: 1.5mm thickeness)**

Preparation

1. **DC power supply: More than 2A at 12V---1 set (For Light box)**
2. **Camera stand: ---2 pieces (Use for DVC type by situation)**
3. **Compact transmission chart**
4. **Various kinds of thin coating optical filter**

Installation example (Camcorde)

1. **Attach one camera stand to the bottom of the Light Box and attach the other one to tripod mount at the bottom of the camcorder. Next, adijust the height of each camera stand(using coares control) so that the central point of the emission face of the Light Box aligns with the central point of the camcoder's lens.**
2. **Detach the end of the collimator (Infinity Adjustment Lens). Be sure to loosen the Light Box's clipping knob before attaching the collimator to**

the Light Box. Screw the end of collomator into the rotary ring one the front of the Light Box to attach.

3. **Attach the other end (lens side) of the collimator to the filter mounting screw of the camcorder's Lens. If it dose not fit, use the step-UP ring provided with the collimator.**
4. **Load the compact transmission chart (gray-scale/color chart) in the chart holder and insert the chart holder into the chart slot.**
5. **Connect the DC regulated power supply (DC 12V ±0.2V, Aapprox. 2.0A) to the Light Box using the provided DC cord (red (+), black (-)) and turn on the power switch at the rear of the Light Box.**
6. **While shooting the chart with the camcorder, adjust (using fine control) the chart holder posiyion as well as the height of the Light Box an camcorder until the desired angle of view is achieved.**

*** Hint:**
Tightening the clipping knob fixes the rotary ring firmly.
When it is completely tightened, the collimator attached to the rotar ring is at right angles to the emission face of the Light Box or chart. If the collimator cannot be attachedto the camcorder, try tightening the clipping knob to compensatefor shearing of the optical axis in the collimator.
On the other hand, if the collimator can be attached to the cam-corder, try loosening the clipping knob slightly to make a little room around the clipping knob.

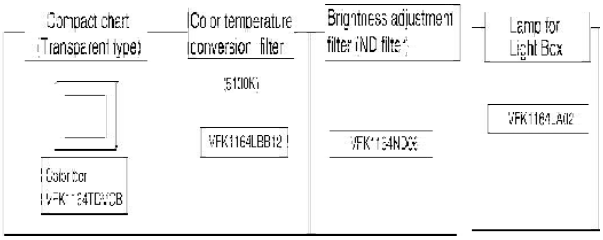
Optical Filter (Made by Triacety cellulose)
Camcorder adjustment requires a commercially-available a color temperature conversion filter. For all

kinds of thin film filters, use the provided filter mount. To make a slip-in filter with the desired optical characteristics, follow the procedures below.
To use a slip-in filter, insert i into the Light Box filter slot. It is possible to insert 7 slip-in filters at a time into the filter slot.

<How to Make a Slip-in Filter>

1. Cut the desired optical filter to 45mm~45mm.
2. Remove the seal at the rear of the filter mount,stick the optical filter in the filter mount (over the hole), then fold the filter mount in half.
3. It is recommended that you write the filter factor on the filter mount.

Kind of Chart and Filter (Spare parts rout)



11.4. LENS ADJUSTMENT PROCEDURE

Lens Adjustment consists of 2 items below:

- Iris Adjustment

- Zoom Trucking Adjust

Lens Adjustment Program has adjustment modes of individual items and an automatic adjustment mode which adjusts successively the all items.
(1) Start-up the HCM CAMERA Service Tool.
(2) Select Model No. BB-HCM381A.
(3) Power on the BB-HCM381CE.

1. Iris Adjustment

Equipment

- None

Procedure
1. Connect the Set from PC through LAN.

2. Press the [Iris] button.

- Adjustment completes with no error → Displays “Adjustment OK”

- Adjustment completes with no error → Displays “Adjustment NG”

3. If “Iris Adjust NG” is displayed, see SECTION 12.4&12.5 TROUBLESHOOTING.

2. Zoom Tracking Adjustment

Equipment

- Focus Pattern Chart

- Collimator

- Light Box

Procedure

1. Place a ND filter in the HP light box.
2. Attach the focus pattern chart to the collimator.
3. Adjust the set's lens at the same height as the HP light box.
4. With keeping the end of the set's lens inserting into the Collimator, insert the focus chart side of the collimator into the HP light box.
5. Connect the Set from PC through LAN to output image.
6. Set the zoom position to Telephoto End and adjust the position so that the Focus Pattern Chart is displayed in the full screen.
7. Press the [Tracking] button.

- Adjustment completes with no error → Displays “Adjustment OK”

- Adjustment completes with no error → Displays “Adjustment NG”

8. If “Tracking Adjust NG” is displayed, see SECTION 12.4&12.5 TROUBLESHOOTING.

3. Auto Adjustment

Equipment

- Focus Pattern Chart

- Collimator

- Light Box

Procedure

1. Set up the HP light box, collimator and the set the same way as 2. Zoom Tracking.
2. Connect the Set from PC through LAN to output image.
3. Set the zoom position to Telephoto terminal and adjust the position so that the Focus Pattern Chart is display in the full screen.
4. Press the [Auto] button.

- Adjustment completes with no error Displays “Adjustment OK”

- Adjustment completes with no error → Displays the error item

5. See SECTION 12.4&12.5 TROUBLESHOOTING for the error item.

11.5. VIDEO ADJUSTMENT PROCEDURE

1. Tools

- Collimator
- Light Box
- Color Chart
- Color Temp. Conversion Filter for 5100K

2. Adjustment Procedure

1. Place the Color Temp. Conversion Filter in the HP light box.
2. Remove the Focus Chart block from the Collimator and attach it with screwing its end into the rotating ring on the front of the light box.
3. Start-up the HCM PTZ CAMERA Service Tool.
4. Select Model Name: HCM381A
5. Install the Active-X for the Video Adjustment to the PC.
6. Connect the tool board to the tilt board of the set.
7. Turn on the Set.
8. Execute browser (IE) and open the single camera page.
9. Adjust the set's lens as the same height as the collimator, and perform an image pickup of the inside of the collimator.
10. Press the "Video Adjustment" button.
11. After displaying “Please shoot the Light Box without chart” and adjust the position and zoom range without the Color Chart so that the White image is displayed in the full screen.
12. Press the "OK" button.
13. Follow the message after displaying dialog.
14. After displaying "Please shoot Color Chart", set the Color Chart to HP light box. Adjust the position and zoom range so that the Color Bar Chart is displayed in the full screen and the target on the screen is placed in the center of each color, as shown in the following Figure.*1
15. Press the "OK" button.

16. When the adjustment completes with no error, the "Adjustment OK" is displayed.
When the adjustment completes with an error, the error item is displayed.

***1 When Security Warning window is displayed under the address bar, please execute next steps.**

1. Click security warnig.

2. Permit the blocked contents.

***In the case of "Adjustment NG", see SECTION 12.5 TROUBLESHOOTING of the TILT BLOCK ASSY (Camera Unit).**

Items which needs the adjustment

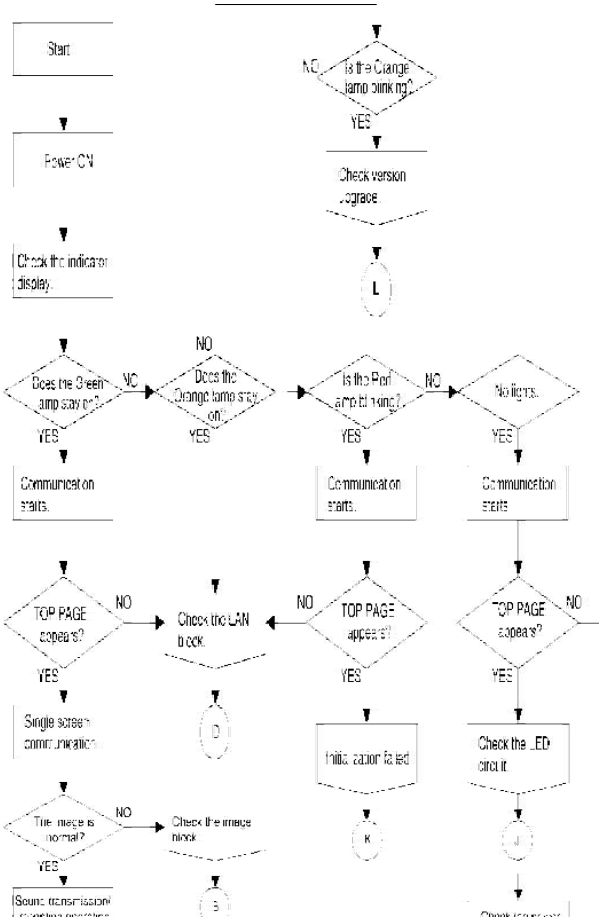
Items	Iris Adjustment	Trucking Adjustment	Video Adjustment
Replace the Lens Unit	O	O	-
Replace the CCD Circuit Board	-	O	O
Replace the IR Cut Filter (PS0F1101)	-	O	O
CCD Unit (Lens Unit + CCD Circuit Board)	O	O	O
Replace the Lens Circuit Board	O	O	O
Repair the Lens Block	O	-	-
Repair the Zoom/Focus Block	-	O	-
Replace the EEPROM (IC1009)	O	O	O
Dark Screen	O	-	O
Discolored	-	-	O
Out of Focus	-	O	-

Note:
Collimator must be inserted all the way into light box until reaching stop point.

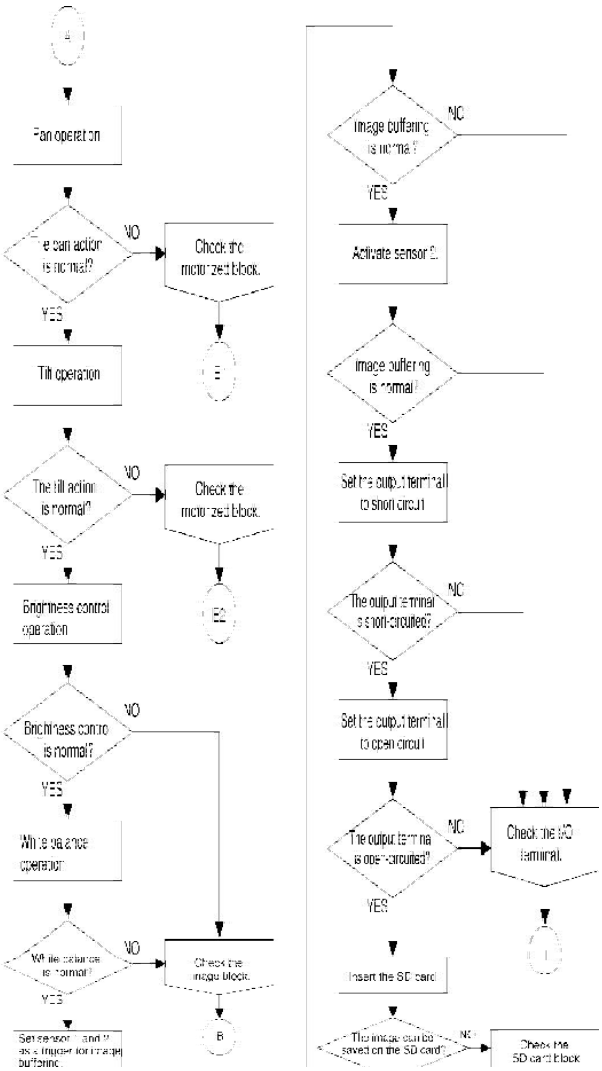
- Viewing angle when taking the Color Chart

12. TROUBLE SHOUTING

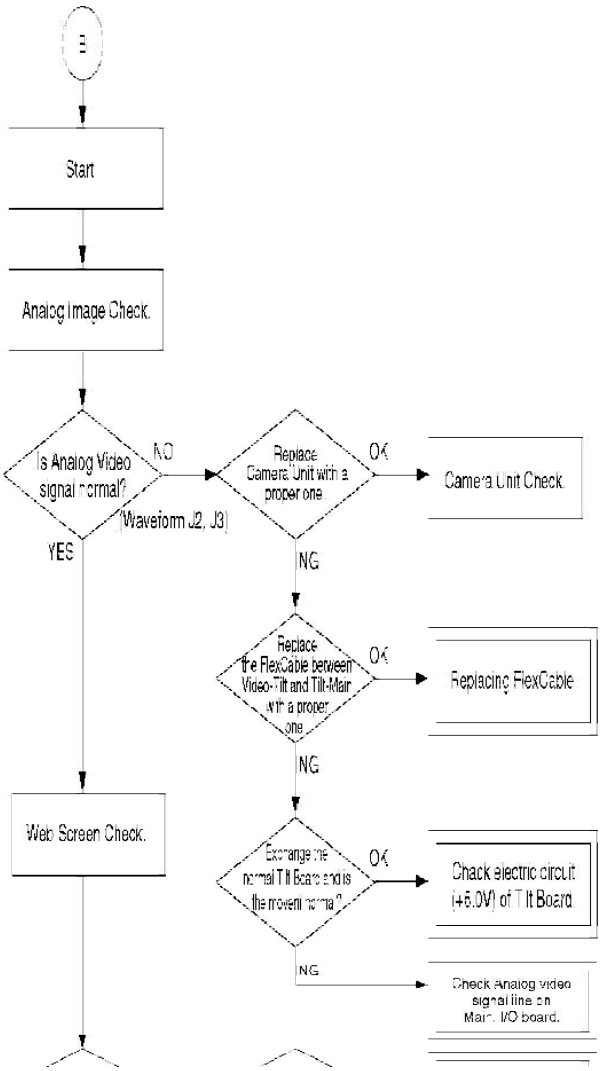
12.1. STARTUP OPERATION

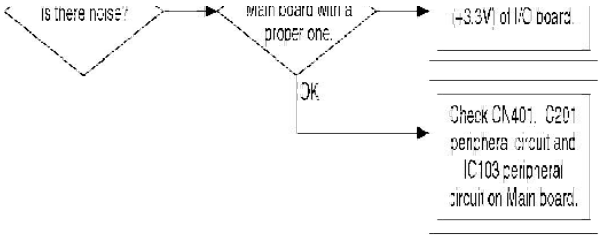


12.2. OTHER FUNCTION CHECK

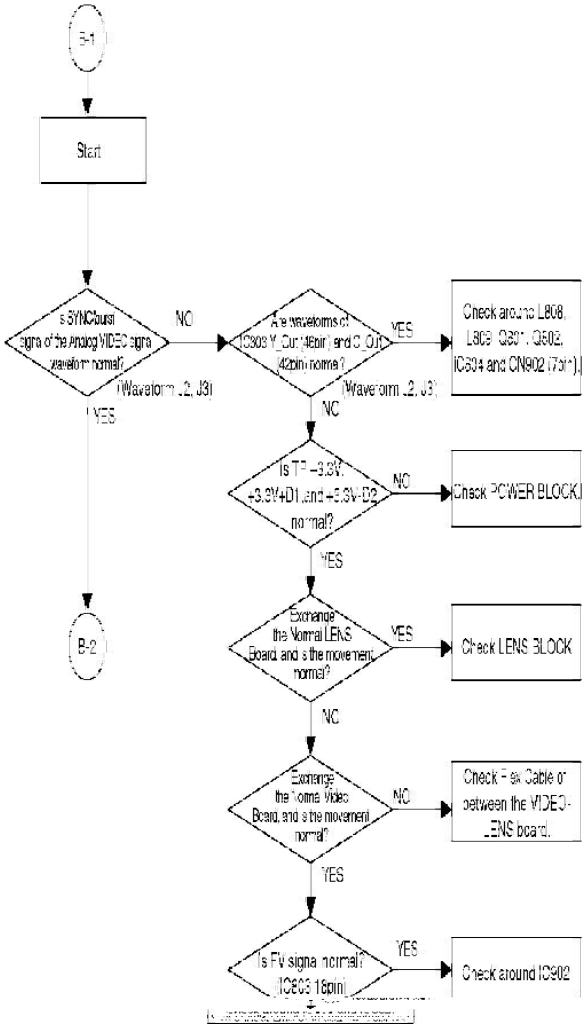


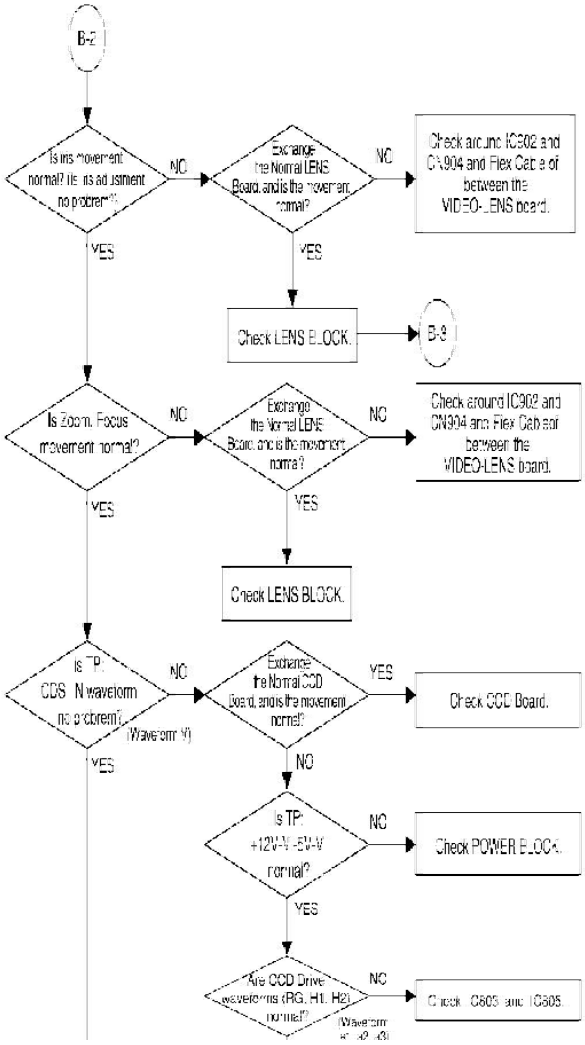
12.3. IMAGES BLOCK CHECK


Start
Analog Image Check.
Is Analog Video signal normal?
NO
(Waveform J2, J3)
YES
Replace Camera Unit with a proper one
OK
Camera Unit Check.
NG
Replace the FlexCable between Video-Tilt and Tilt-Main with a proper one
OK
Replacing FlexCable
NG
Web Screen Check.
Exchange the normal Tilt Board and is the movement normal?
OK
Check electric circuit (+5.0V) of Tilt Board.
NG
Check Analog video signal line on Main I/O board.

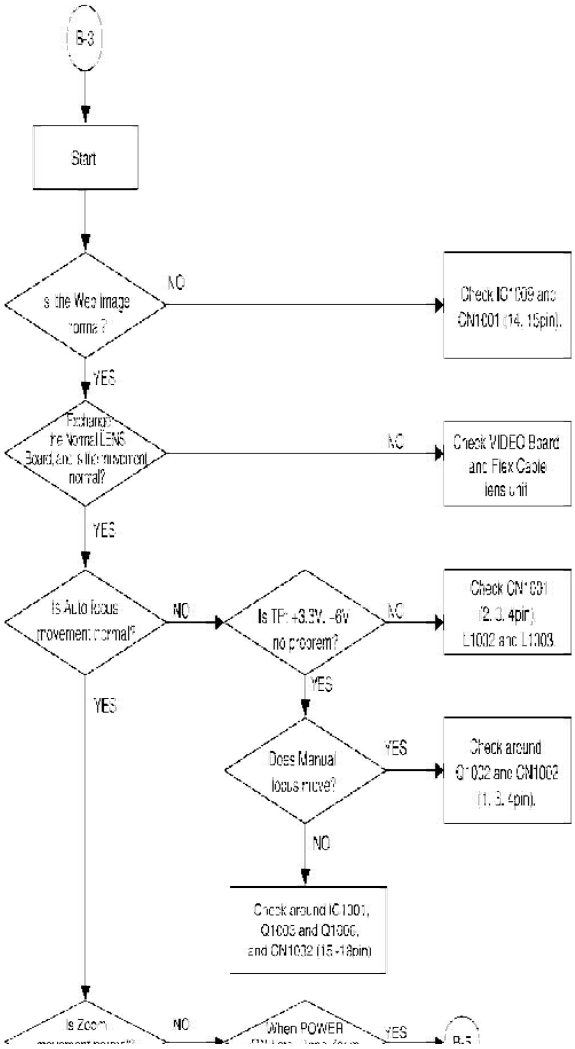

Is there noise?
Main board with a proper one.
(+3.3V) of I/O board.
OK
Check CN401, C201 peripheral circuit and IC103 peripheral circuit on Main board.

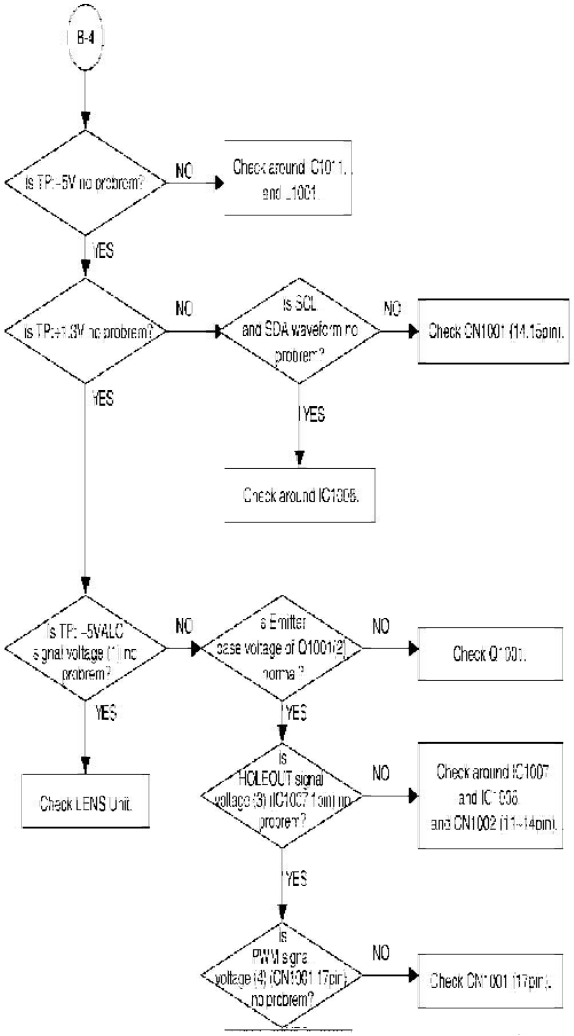
12.4. CAMERA UNIT CHECK


B-1
Start
s SYNC(sus
signa of the Analog VIDEO signa
waveform normal?
(Waveform J2, J3)
NO
YES
Are waveforms of
IC803 Y_Out (48pin) and C_OUT
(42pin) norma?
(Waveform J2, J3)
YES
Check around L808,
L809, Q801, Q802,
IC804 and CN902 (7pin).
NO
Is TP +3.3V,
+3.3V+D1 and +3.3V-D2
normal?
NO
Check POWER BLOCK.
YES
B-2
Exchange
the Normal LENS
Board and s the movement
normal?
YES
Check LENS BLOCK
NO
Exchange
the Normal Video
Board and s the movement
normal?
NO
Check Flex Cable or
between the VIDEO-
LENS board.
YES
Is FV signa normal?
(IC803 16pin)
YES
Check around IC902

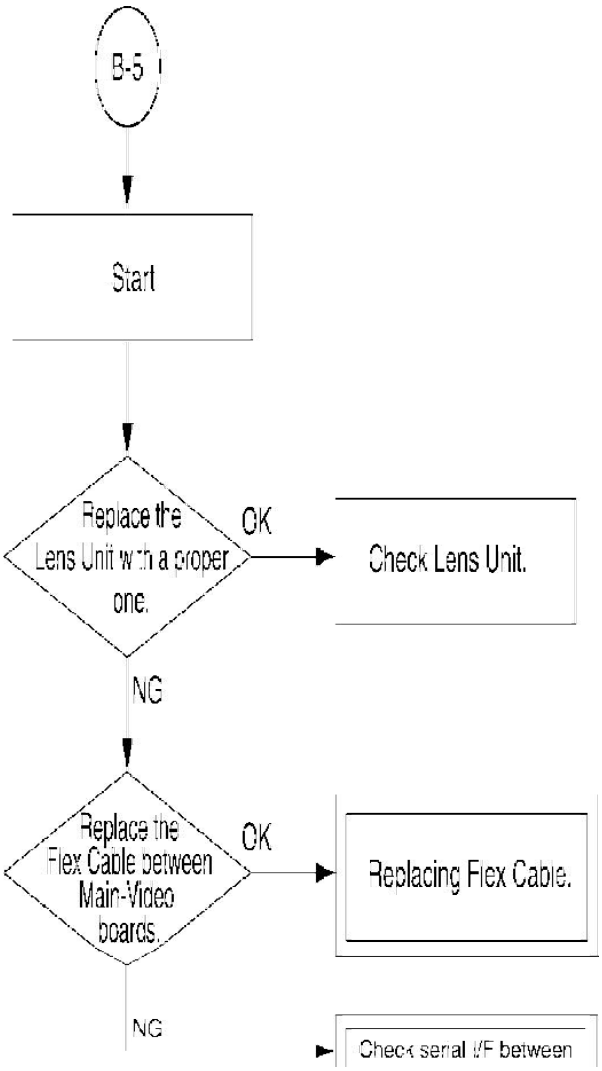


12.5. LENS PCB CHECK

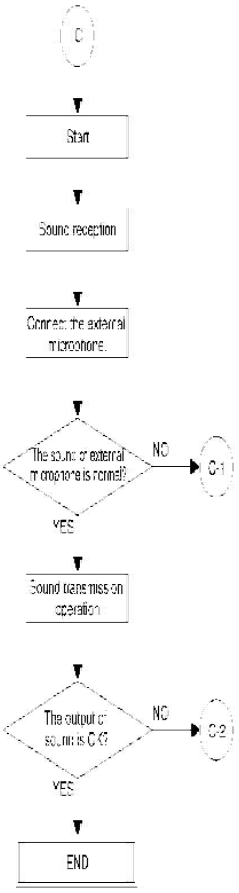

B-3
Start
NO
Check IC1009 and CN1001 (14, 15pin).
YES
NO
Check VIDEO Board and Flex Cable lens unit
YES
NO
NO
YES
YES
YES
Check around IC1032 and CN1002 (1, 3, 4pin).
NO
Check around IC1301, Q1035 and Q1306, and CN1032 (15-18pin)
NO
YES



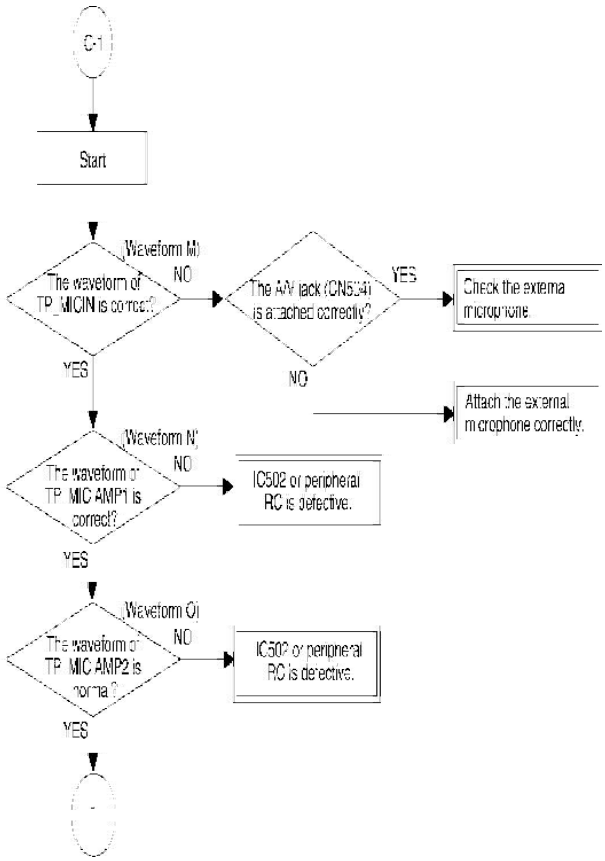
12.5.1. ZOOM Operation Check



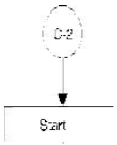
12.6. SOUND BLOCK CHECK



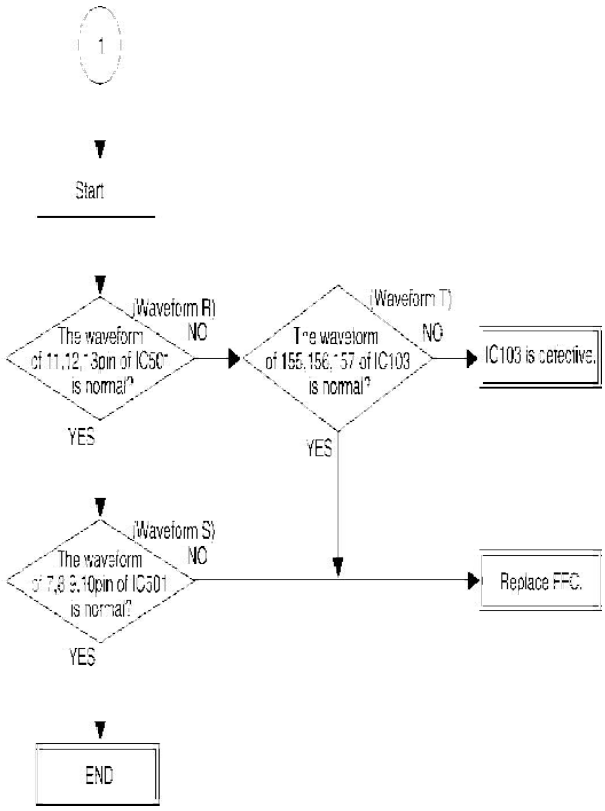
12.6.1. External Microphone



12.6.2. Speaker Output

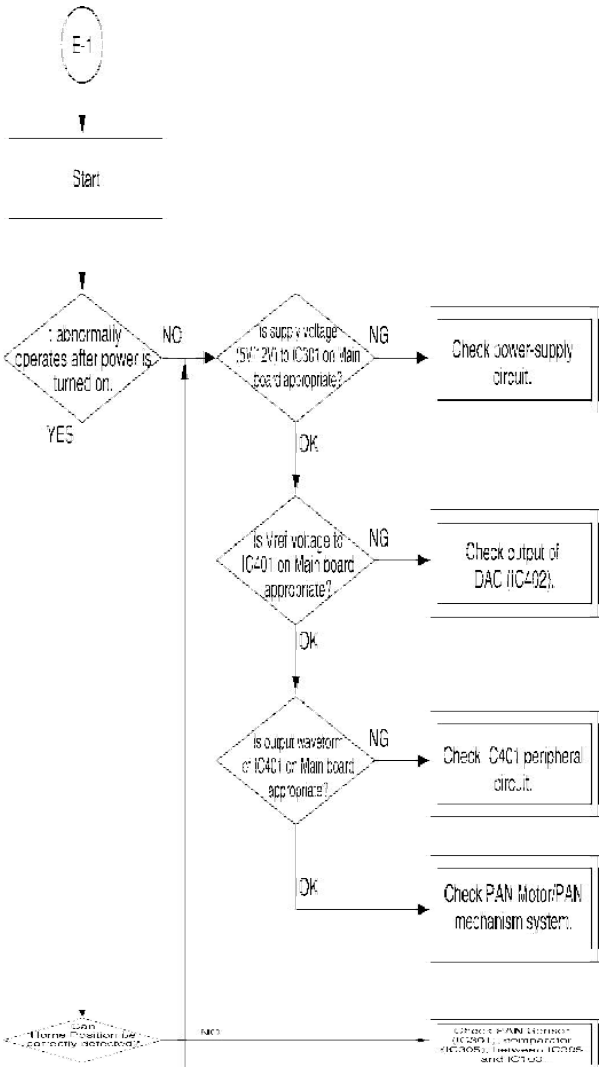


12.6.3. Common Flow for External Microphone and Speaker Output

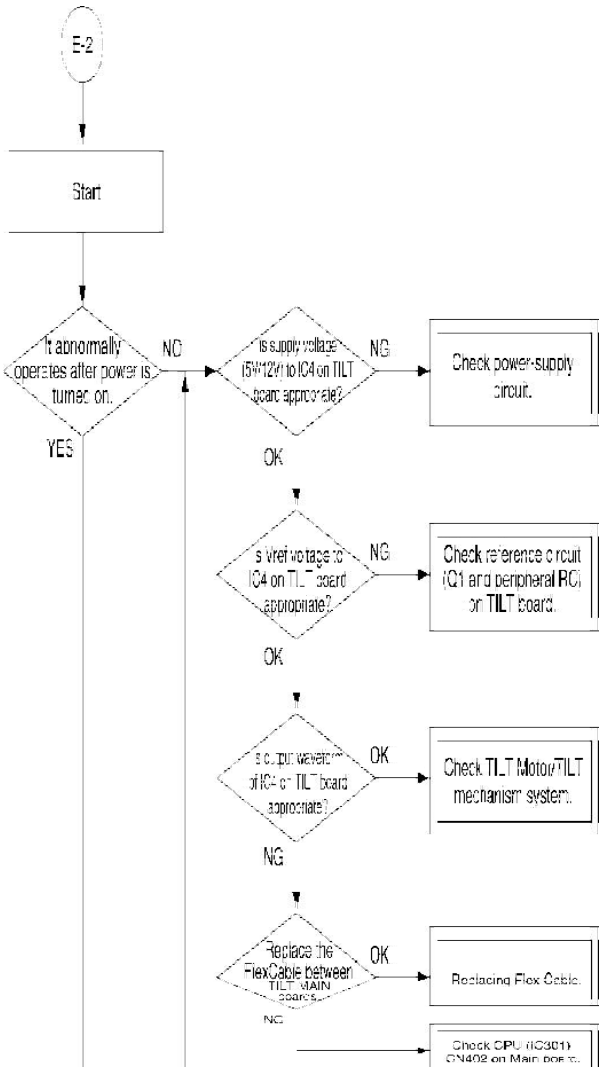


12.7. PAN/TILT OPERATION CHECK

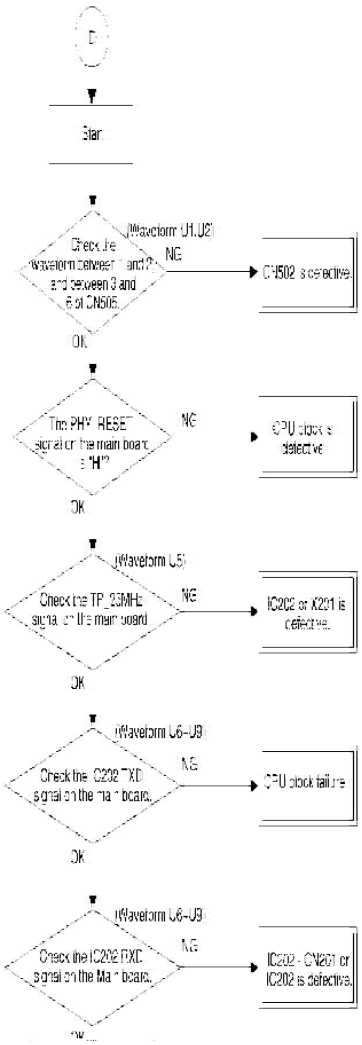
12.7.1. PAN Operation Check



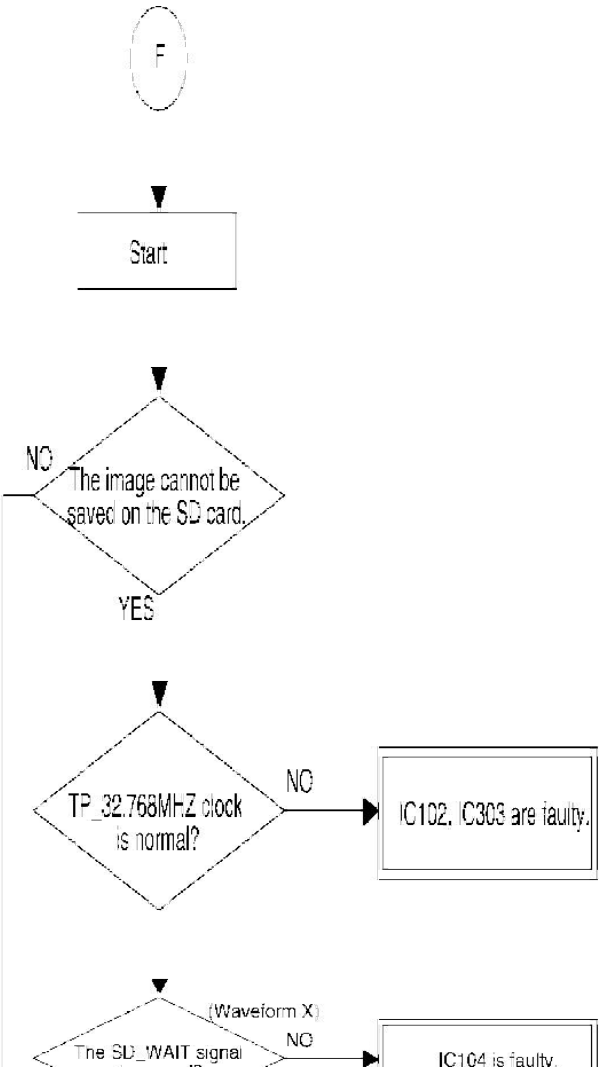
12.7.2. TILT Operation Check

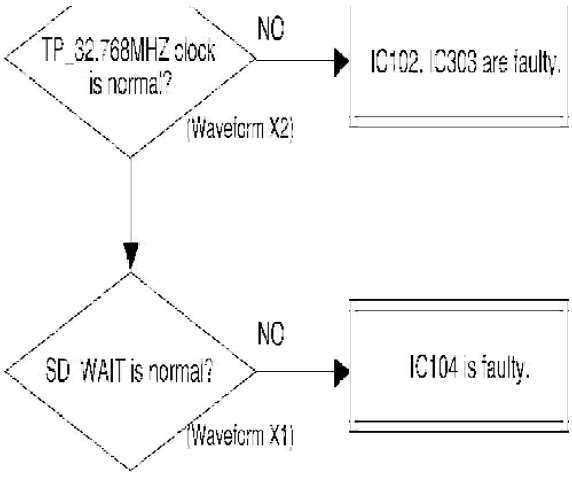


12.8. LAN BLOCK CHECK

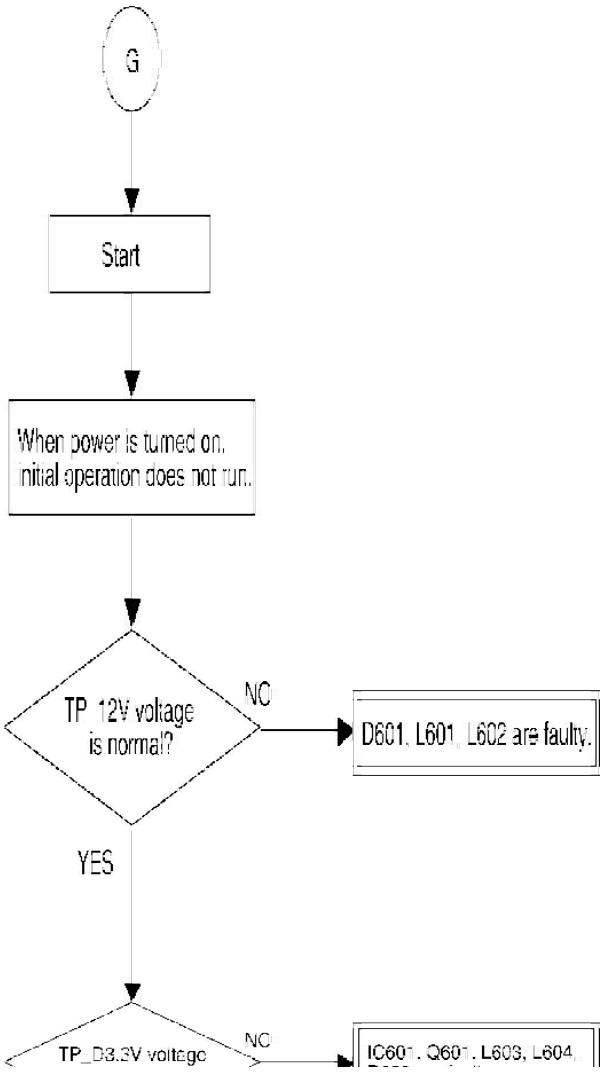


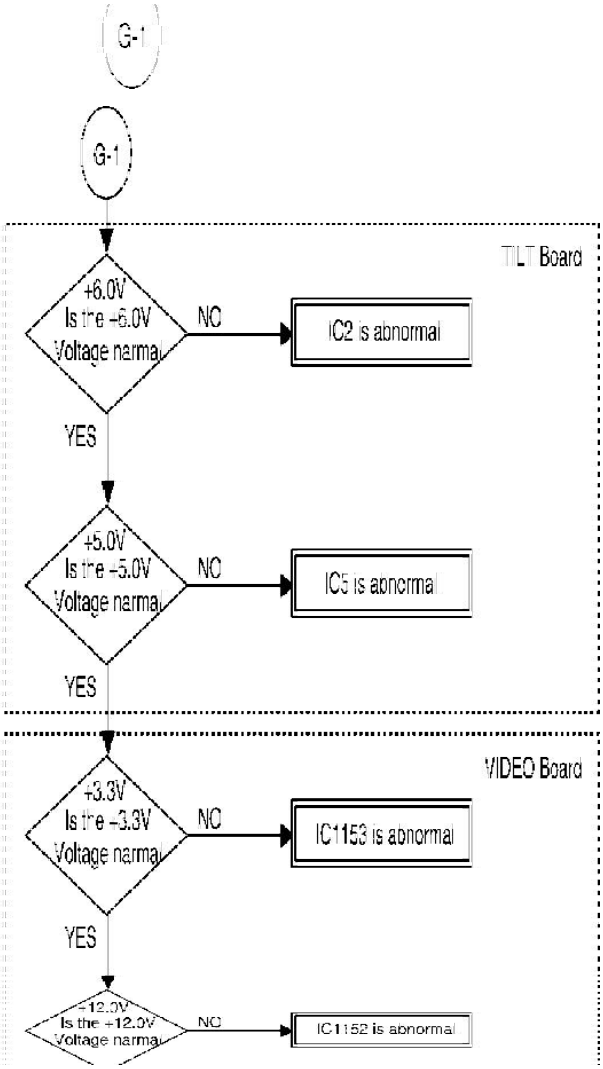
12.9. SD CARD CHECK


F
Start
NO
The image cannot be saved on the SD card.
YES
TP_32.768MHZ clock is normal?
NO
IC102, IC303 are faulty.
(Waveform X)
NO
IC104 is faulty.

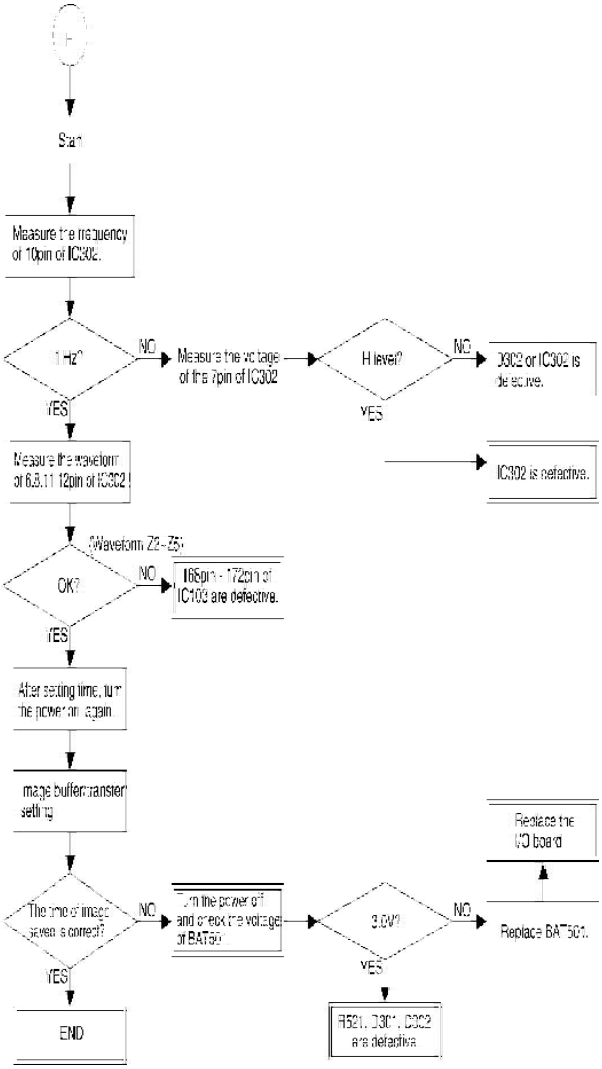


12.10. POWER SUPPLY BLOCK CHECK

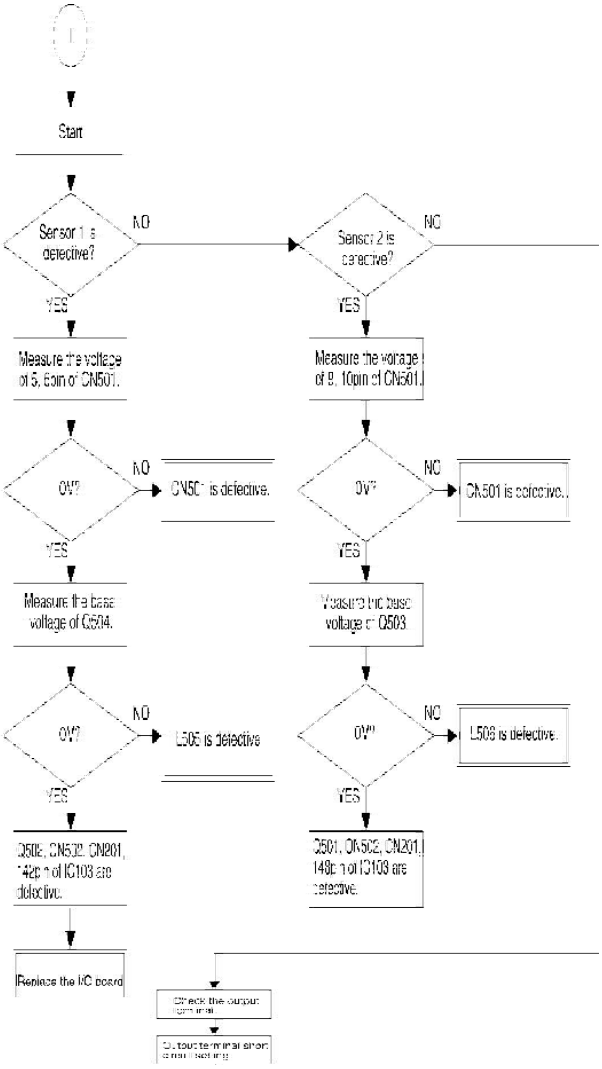

G
Start
When power is turned on, initial operation does not run.
TP_12V voltage is normal?
NO
D601, L601, L602 are faulty.
YES
TP_D3.3V voltage
NO



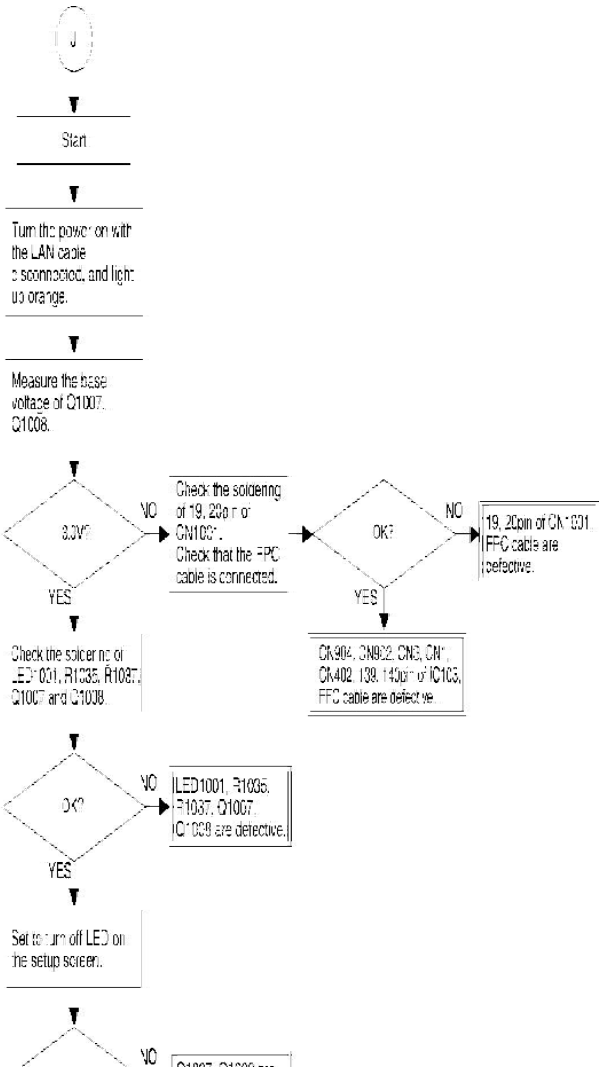
12.11. RTC CIRCUIT CHECK



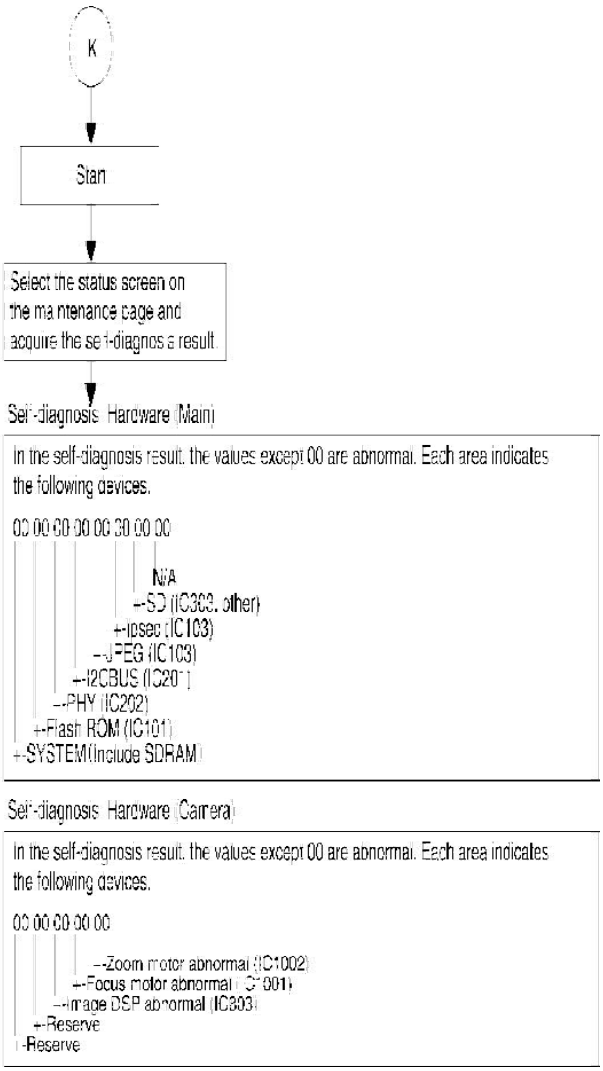
12.12. I/O TERMINAL CHECK



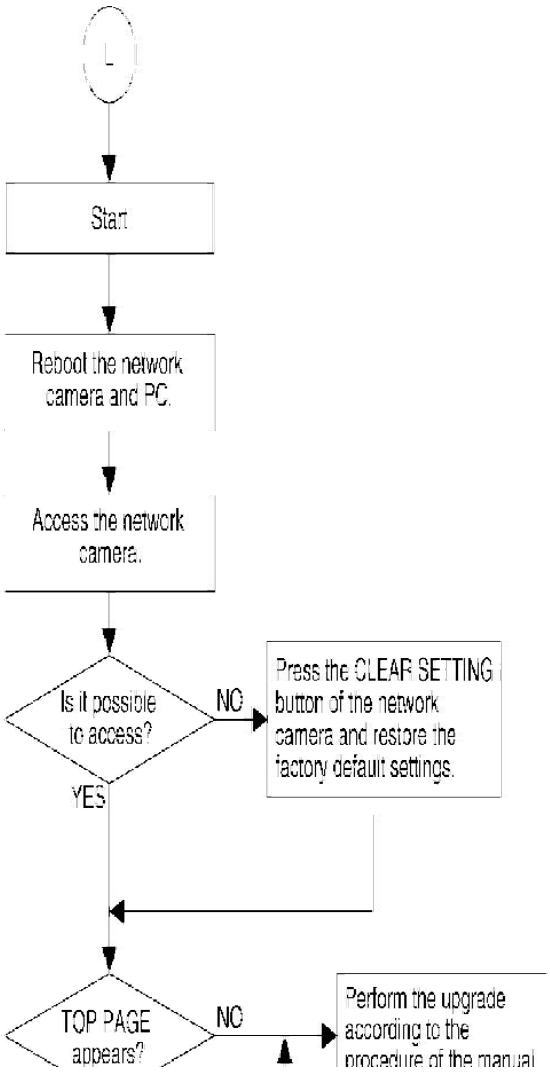
12.13. LED CIRCUIT CHECK


J
Start
Turn the power on with the LAN cable disconnected, and light up orange.
Measure the base voltage of Q1007, Q1008.
3.0V?
NO
Check the soldering of 19, 20pin of CN1001. Check that the FPC cable is connected.
OK?
NO
19, 20pin of CN1001, FPC cable are defective.
YES
YES
CN904, CN902, CN3, CN1, CN402, 139, 140pin of IC103, FPC cable are defective.
Check the soldering of LED1001, R1035, R1037, Q1007 and Q1038.
OK?
NO
LED1001, R1035, R1037, Q1007, IC1009 are defective.
YES
Set to turn off LED on the setup screen.
NO

12.14. INITIALIZATION OPERATION CHECK


K
Start
Select the status screen on the maintenance page and acquire the self-diagnosis result.
Self-diagnosis Hardware (Main)
In the self-diagnosis result, the values except 00 are abnormal. Each area indicates the following devices.
00 00 00 00 00 00 00 00
N/A
SD (IC300, other)
Ipsec (IC103)
JPEG (IC103)
I2CBUS (IC201)
PHY (IC202)
Flash ROM (IC101)
SYSTEM (Include SDRAM)
Self-diagnosis Hardware (Camera)
In the self-diagnosis result, the values except 00 are abnormal. Each area indicates the following devices.
00 00 00 00 00
Zoom motor abnormal (IC1002)
Focus motor abnormal (IC1001)
Image DSP abnormal (IC303)
Reserve
Reserve

12.15. VERSION UPGRADE CHECK


Start
Reboot the network camera and PC.
Access the network camera.
Is it possible to access?
NO
Press the CLEAR SETTING button of the network camera and restore the factory default settings.
YES
TOP PAGE appears?
NO
Perform the upgrade according to the procedure of the manual

12.16. UPDATE FIRMWARE

12.16.1. Update Firmware

Update Firmware window allows the user to install the latest version of the Network Camera internal operating system (Application and Camera firmware). In most cases, this will never be necessary.

Changes may be necessary to accommodate new operating systems or new web browsers that are not shown on Operating Instructions. In those cases, Update Firmware would be available from the Network Camera Technical Support Site at http://panasonic.co.jp/pcc/en/. Check the current firmware version on Operating Instructions.

Note:

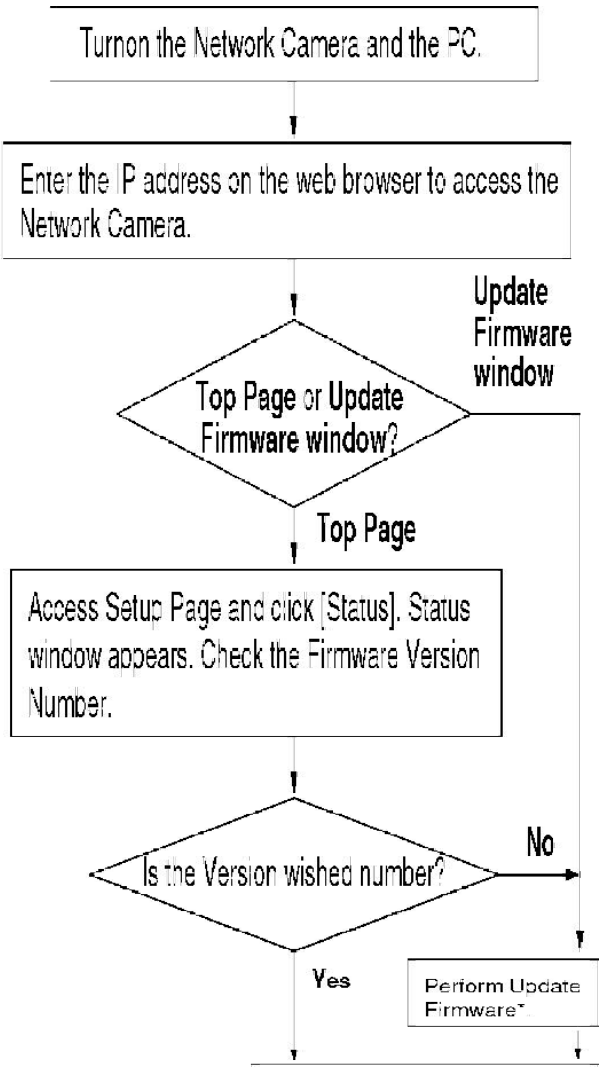
- Do not turn off the power during Update Firmware. If the operation of Update Firmware is stopped, refer to Operating Instructions.
- Buffered Images are erased when performing Update Firmware.

The upgrade of the software for application is practiced to rewrite Flash memory (IC101) on the Main board by CPU (IC103) on the Main board.
And the upgrade of the software for Camera is practiced to set CPU (IC902) on Video board to Boot mode, and to rewrite Flash ROM in CPU (IC902) by way of serial interface by CPU (IC103) on the Main board.

Mode / Control Signal	Normal Mode	Boot Mode
Boot 1 (IC902#66)	L	H
Boot 2 (IC902#67)	H	L

12.16.2. Firmware Trouble Shouting

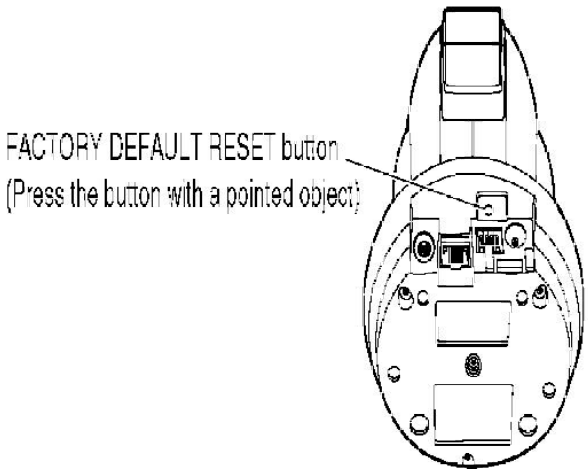
When update missed.
When Update Firmware is interrupted by power off, or for network troubles and other problems, follow the procedure below.


Turnon the Network Camera and the PC.
Enter the IP address on the web browser to access the Network Camera.
Update Firmware window
Top Page or Update Firmware window?
Top Page
Access Setup Page and click [Status]. Status window appears. Check the Firmware Version Number.
No
Is the Version wished number?
Yes
Perform Update Firmware

13. THE WAY OF THE INITIALIZE

13.1. FACTORY DEFAULT RESET Button

The camera has a FACTORY DEFAULT RESET button.



Pressing the FACTORY DEFAULT RESET button resets the camera to factory default. If you lose your user name and password, use this button to reset the camera.

- Press the FACTORY DEFAULT RESET button for 1 second when the camera is on.
- The indicator blinks orange, and then turns off for 5 seconds.
- Do not turn off the camera until the indicator lights green.

Note:

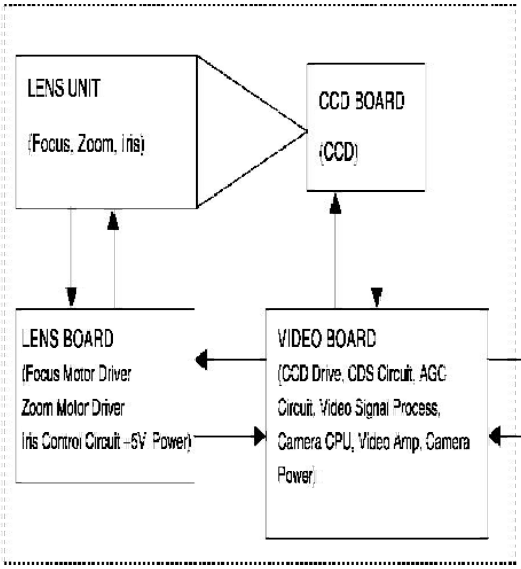
- The internal clock will not be reset, but the time format will return to AM/PM mode. Set it again.
- All buffered images on the internal memory are deleted when resetting the camera to factory default. The buffered images on the SD memory card are not deleted.
- The reset operation takes about 1 minute.

14. BLOCK DIAGRAM

15. CIRCUIT DESCRIPTION

15.1. CAMERA UNIT

Camera Unit is composed of the lens unit, CCD board, VIDEO board and LENS board. It has functions which are video signal imaging/processing/output and lens control (Iris, Focus, Zoom).



15.1.1. CCD Board

Function
Photoelectric transfer by CCD for an imaged object

- CCD (IC1101)
Effective pixels: 768 x 494
Power-supply voltages: 12V, -5V
Image size: opposite angle 4.5 mm (1/4 SIZE)
CCD is driven by horizontal drive signal (H1, H2, RG) and vertical drive signal (V1~V4) that are output from a VIDEO board. The object focused by lens unit are converted to electronic signal. This electronics image signal is read by drive signals and output to IC1001 (7pin) Q1101.

15.1.2. Video Board

Function
CCD output signal process and analog Y/C/Composite VIDEO signal output
Zoom, Focus, Iris in LENS UNIT and the entire signal process control

15.1.2.1. CPU Block

- CAMERA CPU (IC902)
Power-supply voltages: +3.3V, +5V (for A/D, D/A)
Package: 100pin QFP
Clock frequency: 12.288MHz (X901)
Total control of Camera Unit: lens control (Focus, Zoom, Iris), setting/control for Video DSP (IC803), setting/control for CDS&AGC (IC801), drive signal generation for CCD (IC1001)
Within Flash Rom stored Firmware for Camera Unit operation.

The communication with MAIN CPU (IC101) on MAIN board is established by the serial signals (RXD_232C, TXD_232C) via CN902. Also, the communication with CDS&AGC (IC801) and Video DSP (IC803) is established by the serial signals (CS_CDS, SDI_DSP, SDCLK_DSP, SDO_DSP, SLD_DSP). At the time of CPU (IC902) program upgrade, it is set to the upgrade mode by BOOT1 and BOOT2 signal in MAIN CPU (IC101), and the data is transferred via the serial signals (RXD_232C, TXD_232C) and written.

The timing synchronization with Video DSP (IC803) is performed by FV_DSP, EP1_DSP and EP2_DSP. The lens control is performed by signals including PWM connected to the lens board via CN904.

15.1.2.2. Video Signal Process Block

- CDS (IC801)

Power-supply voltages: 3.3V

Package: 36pin QFP

Performs CDS (Correlate Double Sampling) process for CCD output signal from CCD board, AGC (Auto Gain Control) process and A/D conversion (10bit)

CCD output signal is sampled with SP1 and SP2 signal to reduce noise in CDS circuit. Then, after being adjusted to the specified level in accordance with the serial signal (CS_CDS, SDI_DSP, SDCLK_DSP) instruction from CAMERA CPU (IC902) in GCA circuit, it is converted to 10bit, the digital signal with the sampling frequency: 14,31818 MHz of ADCLK input signal by A/D converter. This output signal is adjusted in order that OB (Optical Black) on CCD output signal shall be standard level by OBP signal.

- VIDEO DSP (IC803)

Power-supply voltages: +3.3V

Package: 120pin QFP

Clock frequency: 28.636MHz (X801)

Processes CDS IC (IC801) output signal and outputs Y signal and C signal. Outputs CCD drive signal.

Writing each setting to this IC and reading of data is performed by the serial signal (CS_CDS, SDI_DSP, SDCLK_DSP, SDO_DSP, SLD_DSP) in CAMERA CPU.

<Video signal process>

The signal input from CDS IC (IC801) is composed of luminance signal process and color signal process.

- Luminance signal process

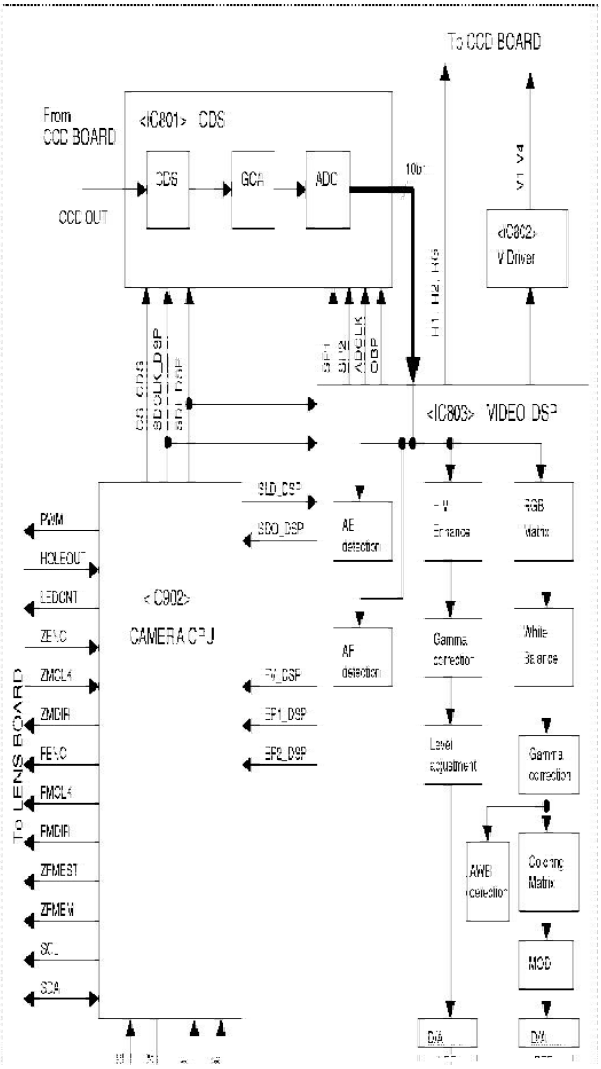
1. Horizontal/Vertical edge enhance
2. Gamma correction for grey-level
3. Adjusts level correctly
4. D/A converts for output

- Color signal process
  1. RGB matrix to convert to RGB signal
  2. White Balance by CAMERA CPU instruction
  3. Gamma correction for R/G/B signal respectively
  4. Color-Difference matrix to convert to the color-difference signal (R-Y, B-Y signal) and to adjust chroma/phase
  5. Modulation process in accordance with NTSC standard
  6. D/A converts for output

Additionally, the detection process for AE (Auto Exposure), AF (Auto Focus) and AWB (Auto White Balance) is made for automatic control. The detection data is read by the serial signal in CAMERA CPU.

<CCD drive signal and Timing signal generation>
Outputs CCD drive signal [horizontal (H1, H2, RG) and vertical (V1~V4)] and Timing signal [Composite Synchronization signal, CAMERA CPU interrupt timing signal (VD, EP1, EP2) and signal for CDS IC (SP1, SP2, ADCLK, OBP)]. The signal timing is set by the serial signal in CAMERA CPU.

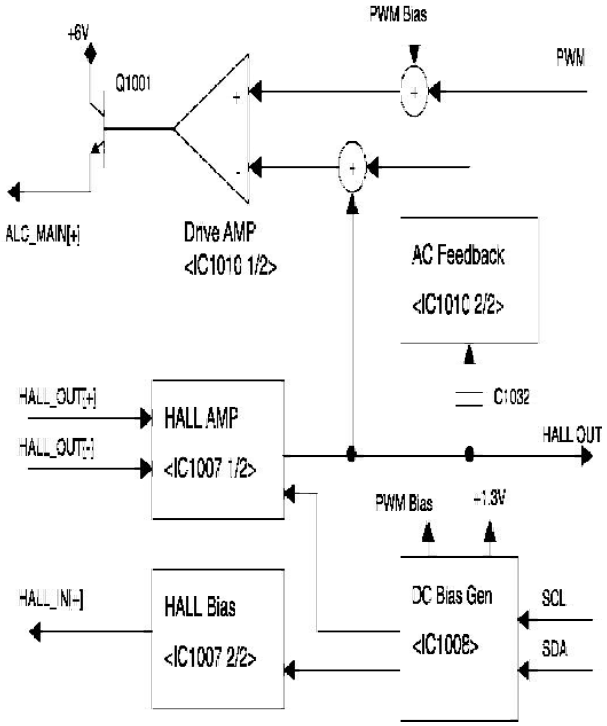
- V Driver (IC802)
  Power-supply voltages: -5V, +3.3V, +12V
  Package: 20pin SOP
  Generates CCD vertical drive signal from CCD vertical drive timing signal in VIDEO DSP (IC803).
  CCD vertical drive timing signal with +3.3Vp-p is converted to binary (-5V~0V) and to ternary (-5V~0V~+12V), and is output as V1~V4 signal.



15.1.3. Lens Board

Function
Zoom, Focus and Iris in LENS UNIT driving.

15.1.3.1. IRIS Drive Block

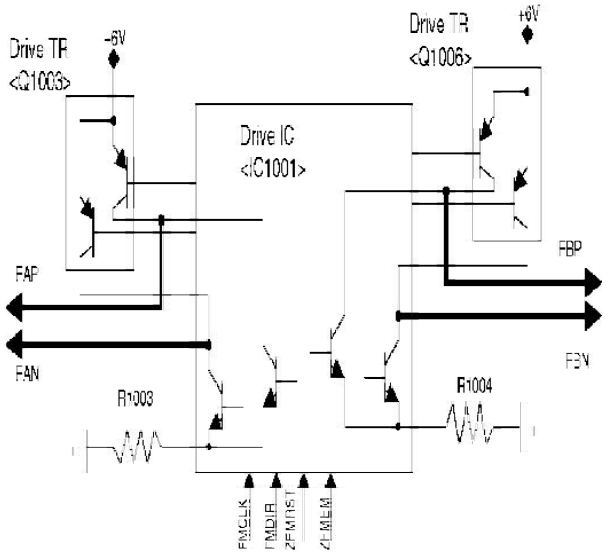


PWM signal from MAIN board is compared with HALL OUT signal in Drive AMP (IC1010), and drives Iris in LENS UNIT as ALC_MAIN [+] signal so that the difference between PWM and HALL OUT may be zero. HALL OUT signal is produced by IC1007 from HALL_OUT [+]/HALL_OUT [-] signal, which are produced depending on the Iris position in LENS UNIT, and generates voltage as large as Iris opens. The HALL_OUT signal is transferred to MAIN board as the information for Iris position and also, its AC component is transferred through C1032 to IC1010 for stabilization of Iris drive, and then a stabilized signal is produced. This stabilized signal is added to HALL OUT signal.
In DC bias Generator (IC1008), DC voltage is generated by I2CBUS signal (SCL, SDA) from MAIN board, and the voltage will apply to PWM signal bias voltage (4pin output), OP amp bias (+1.3V: 3pin output), HALL bias circuit (IC1007) (1pin output) for HALL device bias voltage generation in LENS UNIT and HALL OUT signal DC level decision (2pin output).

15.1.3.2. Zoom Motor Drive Block

The ZOOM motor, which type is a stepping motor, is driven with the motor driver (IC1002). The drive system is Constant Current Drive 2W1-2 Phase Excitation Micro Step Drive. It works by 1 step to the direction set by ZMDIR signal, per 1 clock of ZMCLK signal given to IC1002. The motor current flows as below. In phase A: 6V power → Q1004 6pin → Q1004 1pin ZAP signal motor phase A ZAN signal → IC1002 14pin → IC1002 19pin → R1005 → GND, or, 6V power Q1004 3pin Q1004 4pin → ZAN signal → motor phase A → ZAP signal → IC1002 16pin IC1002 19pin R1005 GND In phase B: Q1005 3pin → Q1005 4pin → ZBP signal → motor phase B ZBN signal IC1002 11pin IC1002 6pin → R1006 → GND, or, 6V power → Q1005 6pin Q1005 1pin ZBN signal motor phase B → ZBP signal → IC1002 9pin → IC1002 6pin ' R1006 GNDThe motor driving direction is determined by ZMDIR signal.

15.1.3.3. Focus Motor Drive Block



FOCUS motor, which type is a stepping motor as ZOOM motor, and which drive circuit is also same type as ZOOM motor, is driven with the motor driver (IC1001). The drive system is Constant Current Drive 2W1-2 Phase Excitation Micro Step Drive. It works by 1 step to the direction set by FMDIR signal, per 1 clock of FMCLK signal given to IC1001. The motor current flows as below. In phase A: 6V power Q1003 6pin Q1003 1pin FAP signal motor phase A FAN signal IC1001 14pin IC1001 19pin R1003 GND, or, 6V power Q1003 3pin Q1003 4pin FAN signal motor phase A FAP signal IC1001 16pin IC1001 19pin R1003 GND In phase B: Q1006 3pin Q1006 4pin FBP signal motor phase B FBN signal IC1001 11pin IC1001 6pin R1004 GND, or, 6V power Q1006 6pin Q1006 1pin FBN signal motor phase B FBP signal IC1001 9pin IC1001 6pin R1004 GND The motor driving direction is determined by FMDIR signal.

15.1.3.4. EEPROM Block

- EEPROM (IC1009)

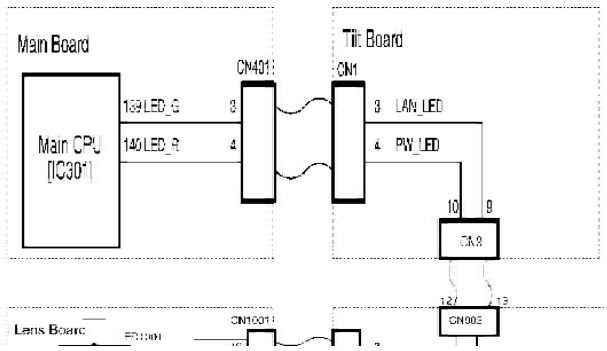
Power-supply voltages: 3.3V
Package: 8pin SOP
Memory Capacity: 2K x 8bit

It shall be READ/WRITE by I2CBUS signal (SCL, SDA). Memorizes the values of LENS adjust, VIDEO adjust and VIDEO DSP install. When the power is ON or camera unit is reset, it is READ and installed to each system.

15.1.3.5. LED Block

A line crack and a control signal relay a Tilt board and a Video board from Main CPU by which control of LED was mounted on the Main board, and it is inputted into the LED control circuit mounted in the Lens board.
(As for LED, the 3 color LED is used.)

LED_G	LED_R	LED COLOR
H	H	Orange
H	L	Green
L	H	Red
L	L	OFF the light



15.1.4. Camera Unit Power Supply Block

The power block generates power supply to be used in each part.

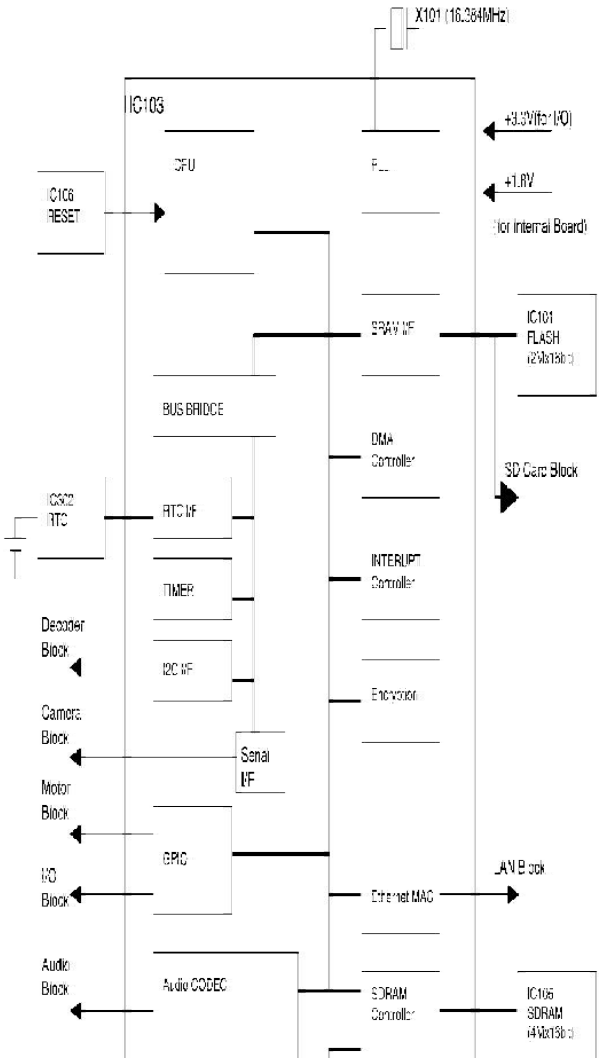
15.2. CPU PERIPHERAL BLOCK

- The IC103 is a system LSI for a network camera containing the CPU.
- The power supply voltages are +3.3V (I/O) and +1.8V.

- The CPU is a 32-bit RISC CPU and performs mainly hardware control, TCP/IP protocol processing and applications such as http and FTP.
- The clock setting is 65.536MHz, which is the four times of 16.384MHz oscillation in the X101 by PLL.
- There are two types of external bus: the General-purpose bus through SRAM I/F and the bus for SDRAM only.
- The General-purpose bus is connected to a Flash Memory for program storage.
- The capacity of the Flash Memory (IC101) is 32Mbit (2Mx16bit); the program, the setting information for the network camera and the MAC address are stored.
- The SDRAM (IC105) is 64Mbit (4Mx16bit) and used for the CPU processing work, the communication data storage and the sound and image data storage.
- The RESET IC (IC106) monitors the power supply voltage, detects the rising edge of +3.3V and generates the Hardware ResetSignal.
- The IC302 is a RTC (Real Time Clock) and is used for the time setting of the image transfer. It is backed up at power-off by a lithium battery (BAT501). The I/F with the CPU has a dedicated controller. (5-line I/F)
- The Encryption block inside the IC103 is an IPsec communication encryption engine and is used at the software protocol processing.
- The camera CPU (IC902) on video board is connected to the CPU (IC103) through serial interface.

Signal Flow

1. When a request from the PC is received through LAN, the CGI command is analyzed at the CPU and the requestedimage/sound data are generated.
2. The JPEG image and sound data accumulated on the SDRAM are formed in IP packet by the protocol processing.
3. If the IPsec is not encrypted, it is sent without change. If it is encrypted, this is carried out in the Encryption Block and a header is added to send to the Ethernet MAC part.



15.3. VIDEO DECODER & JPEG BLOCK

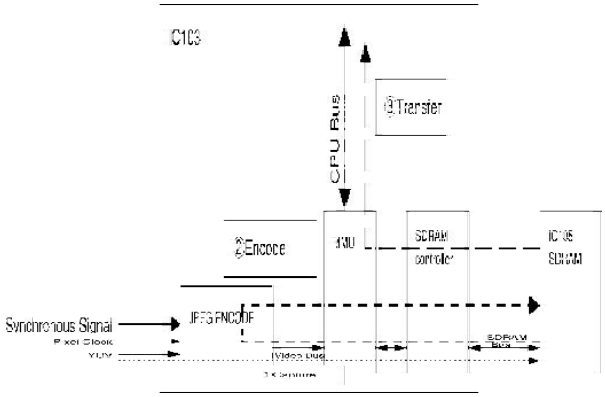
VIDEO DECODER (IC201)
Operating Power Supply: +3.3V
Package: 100 pin QFP
Operating Clock: 24.54MHz
The video decoder (IC201) converts the analog video signal output from the camera unit into the digital signal in real time. It converts each analog signal of Y/C into 8 bit *2 digital signal of Y/UV.

Image Data Flow

1. **The analog Y/C signal is sent to the video decoder from the camera unit.**
2. **The above data is converted into 8 bit YUV data with the video decoder**

(IC201), and then sent to VIDEO-I/F of JPEG (IC103).

3. IC103 is system LSI for the network camera with built-in CPU.
4. This LSI are built into JPEG encode circuit, memory management unit (MMU), and the SDRAM controller.
5. Image data (YUV) input from the camera block is captured by SDRAM by way of JPEG encode block → MMU SDRAM controller. (1)
6. The captured YUV data are input to the JPEG Encode Block again and the JPEG processing is performed here. The compressed encode data are stored in SDRAM. (2)
7. A header is added to the encoded JPEG data by a direction of the CPU and it is transferred to a network after a protocolprocessing. (3)



15.4. SOUND BLOCK

External Microphone / Speaker Jack (CN504)
Used with connecting a external microphone or a speaker with a built-in amplifier through dedicated cable when a external microphone is used or the sound is output from a camera.

ALC Amplifier (IC502)
Power Supply Voltage: 3.3V
Amplifier for Auto Level Control

PCM CODEC (IC501)
Power Supply Voltage: 3.3V
Clock Frequency: Contains a built-in PLL function and generates a clock from the BCLK (256 KHz). Contains an amplifier, LPF, gain adjustment, AD/DA converter, host I/F, PCM serial I/F and speaker output function.

Sound Signal Flow
[Microphone sound]

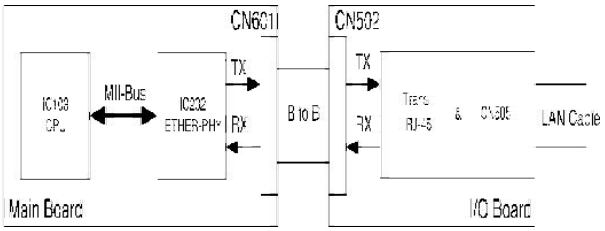
1. **The sound data input from A/V jack (CN504) is amplified by the amplifier in the PCM CODEC (IC501) and the ALC (IC502), then input as the built-in microphone to the PCM CODEC (IC501) again.**
   When the level of the input sound signal is more than the set value, the gain is changed and the output signal level is kept constant at the ALC (IC502). Sound distortion is controlled when the input is excessive.
2. **In the PCM CODEC (IC501), by a register setting from the host, amplification, A/D conversion and gain adjustment are performed.**
   The sampling frequency of the A/D conversion is 8kHz and it is converted to the PCM in the format of 8bit and É law. Then, 64kbps data are output to the ASIC (IC103) through the Serial I/F.
   The data transfer CLK of the Serial I/F is BCLK (256 kHz).
3. **performed in the ADPCM Block of the ASIC (IC103) and the data is transferred as sound data.**

[Speaker Sound]

1. **The ADPCM sound data are sent from the PC and decompressed in the ADPCM block of the ASIC (IC103). The data are transferred as the sound data of 64kbps to the PCM CODEC (IC501) through the Serial I/F.**
2. **After the law to linear conversion, amplification and D/A conversion are performed, they are output to A/V jack (CN504) as sound output signal in the PCM CODEC (IC501).**

15.5. LAN BLOCK

Composed of the IC103 (CPU), the IC202 (ETHER-PHY), the CN505 (RJ45 with a built-in transformer). The transformer in the CN505 provides isolation between the Set and the Ethernet.
The IC103 (CPU) and the IC202 (ETHER-PHY) are connected by a signal called MIIBus and it makes Ether net data sending and receiving possible.
Sending
The electrical signal sent from the IC103 is converted to Ethernet data at the IC202 and sent from the CN505 .
Receiving
The Ethernet data received from the CN505 is converted to electrical data at the IC202 and received to the IC103.



15.6. MOTOR DRIVE BLOCK

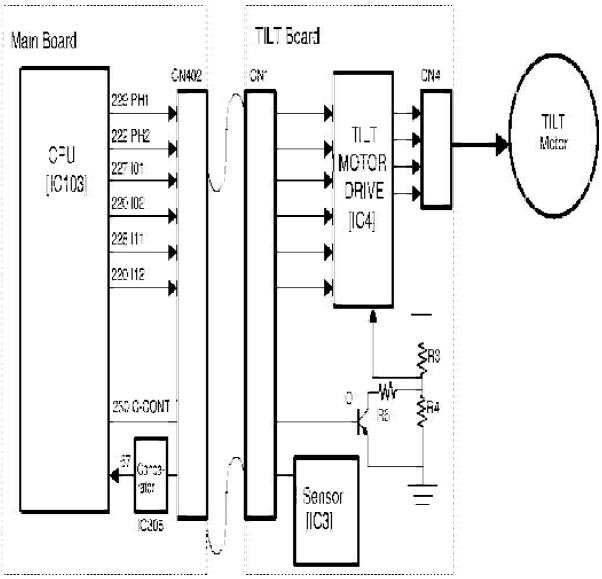
15.6.1. PAN Control Block

A PAN motor is performed when CPU mounted on the Main board controls the motor driver IC on this substrate (IC401).
Moreover, the absolute position of the PAN operation is detected by the photo sensor (IC301) mounted on this board is realized using the photo sensor (IC301) mounted on this substrate. The detection signal of a photo sensor is detected level by comparator (IC305) and is input to CPU port.

15.6.2. TILT Control Block

A TILT motor is performed when CPU mounted on the Main board controls the motor driver IC on a TILT board (IC4).
Moreover, the absolute position of the PAN operation is detected by the photo sensor (IC3) mounted on this board is realized using the photo sensor (IC3) mounted on this substrate The detection signal of a photo sensor is detected level by comparator (IC305) and is input to CPU port. At the time of TILT

operation, phase current from a motor driver is enlarged, and while not operating, it is controlled to lessen (C-CONT).
(At the time of operation: C-CONT='L', At the time of stop: C-CONT='H')

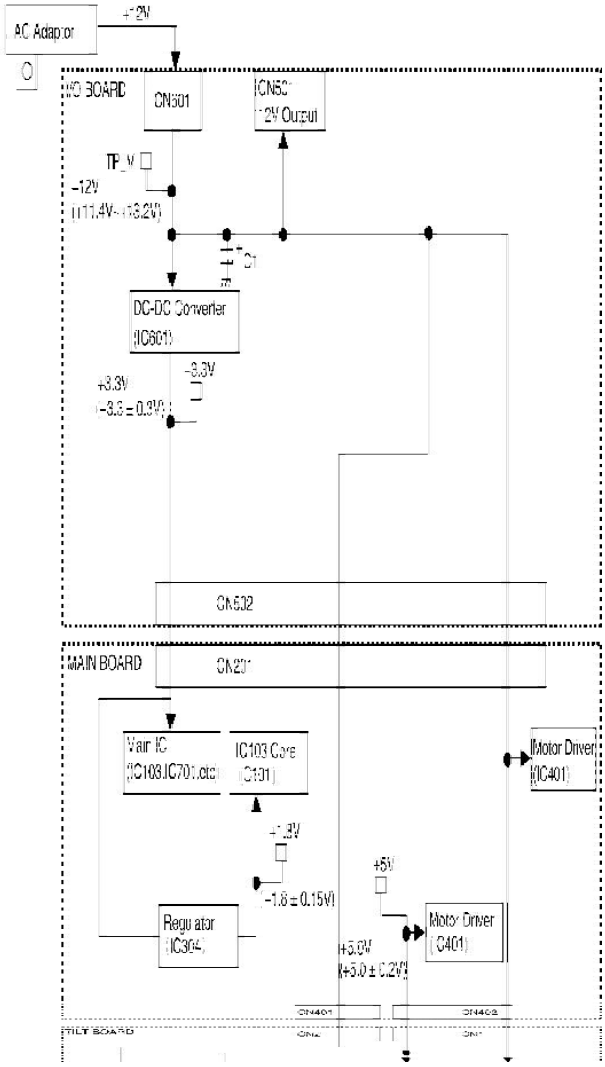


15.7. SD CARD BLOCK

When playing sounds, the data written on the SD Card are read out by the SD Card Controller (IC303) and divided into IP Packets in the ASIC (IC103) to be sent to the LAN.
When recording sounds, the JPEG-compressed image data at the ASIC (IC103) are written on the SD Card by the SD Card Controller (IC103) through the SD Card connector.

15.8. MAIN PART POWER SUPPLY BLOCK

The power block generates power supply to be used in each part.



15.9. OTHERS

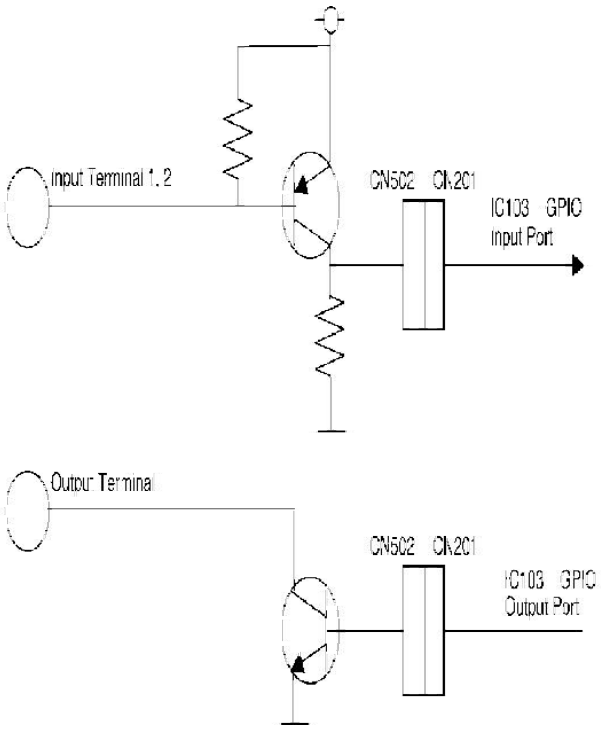
15.9.1. I/O Terminal

- The Input terminal has two systems; both of them are connected to the Input Port of the IC103 GPIO.

- Due to Internal Pull-up Resistance, the PNP Transistor (Q501, Q502) on the following stage is usually in the OFF state and the Input Port connected to the collector is at L level.

- If the terminal is short-circuited with the GND or the signal of L level is input, the PNP Transistor goes ON and the Input Port goes to H level.

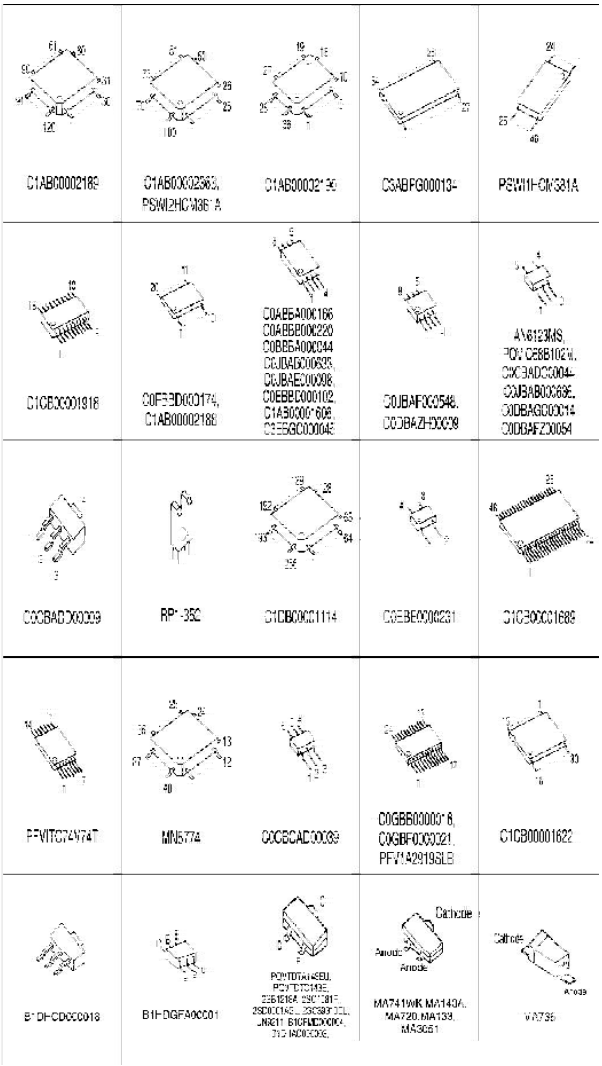
- The CPU checks the state of this port regularly to detect a change in this signal.
- The Output terminal is controlled by the Output Port of the IC103. When the Port output is L, the transistor (Q503) on the following stage is OFF and, when the output is H, the transistor is ON. This transistor has open collector output and it controls external equipment via external pull-up.



15.9.2. Clear Setting SW

- The CLEAR SETTING SW (SW101) is connected to the Input Port of the GPIO. It is usually at H level and goes to L level when the SW is pressed.
- The CPU monitors this Input Port regularly and, if it detects that this SW is pressed longer than the set period, the setting values other than the RTC are returned to the factory settings.

16. TERMINAL GUIDE OF ICS, TRANSISTORS AND DIODES



17. HOW TO REPLACE A FLAT PACKAGE IC

17.1. PREPARATION

- PbF (: Pb free) Solder

- Soldering Iron

Tip Temperature of 700°F ± 20°F (370°C ± 10°C)

Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.

- Flux

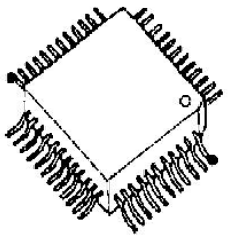
Recommended Flux: Specific Gravity 0.82.

Type → RMA (lower residue, non-cleaning type)

Note: See ABOUT LEAD FREE SOLDER (PbF: Pb free) ().

17.2. PROCEDURE

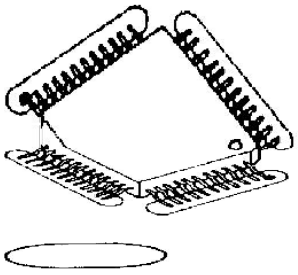
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



●- - - - - -Temporary soldering point.

Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.

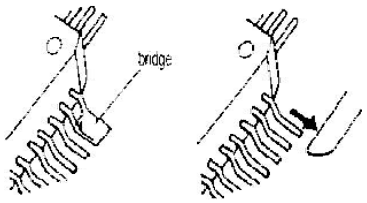


3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.

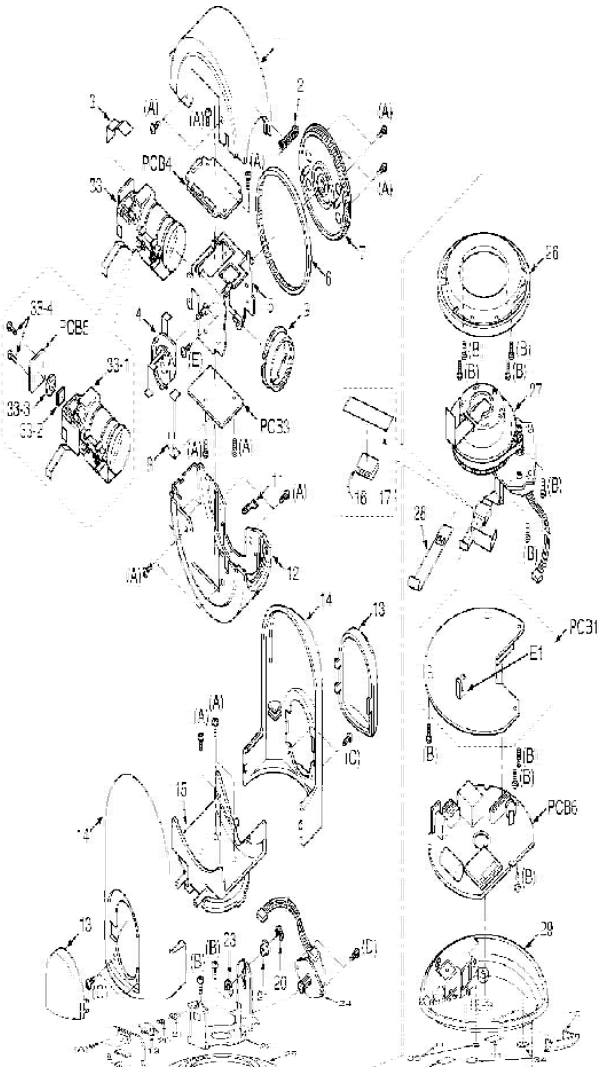
17.3. REMOVING SOLDER FROM BETWEEN PINS

1. Add a small amount of solder to the bridged pins.

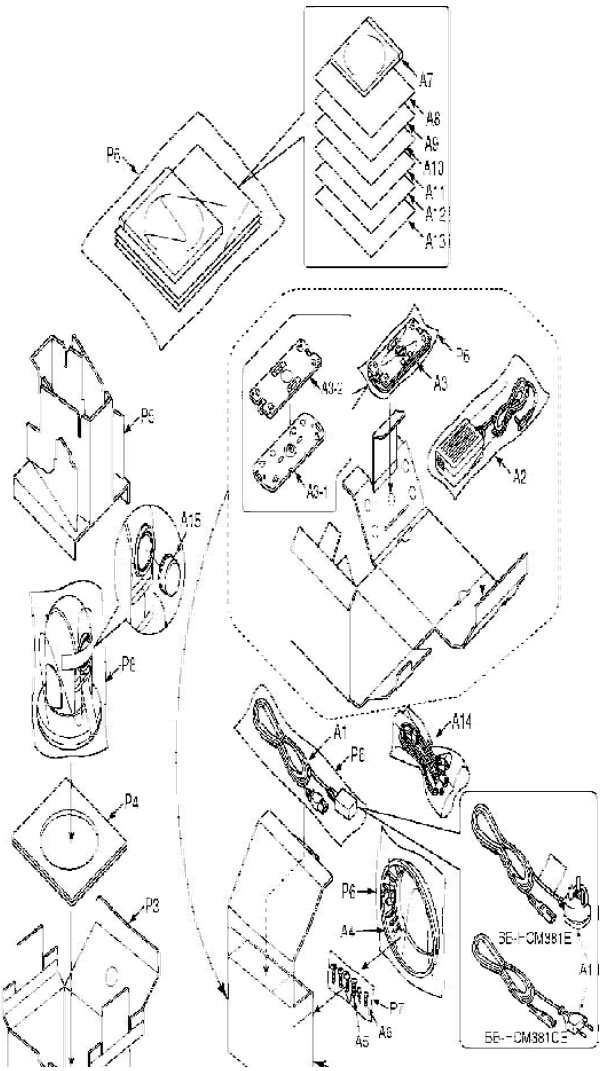
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.



18. CABINET AND ELECTRICAL PARTS LOCATION



19. ACCESSORIES AND PACKING MATERIALS



20. REPLACEMENT PARTS LIST

Note:

1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for this item.
After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.

2. **Important safety notice**
   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.
3. **The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.**
4. **ISO code (Example : ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.**
5. **RESISTORS & CAPACITORS**
   Unless otherwise specified;
   All resistors are in ohms (Ω), k=1000 , M=1000k
   All capacitors are in MICRO FARADS (F), p= (F)
   ***Type & Wattage of Resistor**

20.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PSKE1063X1	COVER,TILT(UPPER)	ABS-V0
2	PSGB1007Z	BADGE	
3	PSJE1037Z	LEAD WIRE, FCC (VIDEO-CCD)	
4	PSZE1HCM180N	COVER, CABINET HOLDER	POM-HB
5	PSMH1254Y	CHASSIS, LENS	
6	PSDV1003Z	FLAT BELT,TILT BELT	
7	PSHR1287Z	TILT GEAR	POM-HB
8	PSUP1435Z	LEAD WIRE, FCC (VIDEO-LENS)	
9	PSKV1034Z1	COVER, LENS	ABS-V0
10	PSKV1053Z1	COVER,SD	
11	PSHR1285Z	OPTIC CONDUCTIVE PARTS, LED LENS	PS-HB
12	PSKE1064Z1	COVER, TILT(LOWER)	ABS-V0
13	PSKV1033Z2	COVER, PAN SCREW	ABS-V0
14	PSKV1032Y2	COVER, PAN	ABS-V0
15	PSKE1065Y2	COVER, PAN (LOWER)	ABS-V0
16	J0KD00000074	PLASTIC PARTS, FILTER	
17	PSHE1158Z	SPACER	
18	PSHX1213Z	PLASTIC PARTS, FCC SHEET	
19	PSHR1289Z	SPACER	ABS-V0
20	XUC3FJ	RETAINING RING	
21	B-F4-73	SPACER	
22	PSMH1257Y	FRAME,TILT	
23	PSHX1214X	SPACER	
24	PSWQ2HCM180N	DC MOTOR,TILT	
25	PSKM1108Z2	CABINET BODY	ABS-V0
26	PSHR1291Z	GUIDE, PAN SLIDER	POM-HB
27	PSWQ1HCM381N	DC MOTOR, PAN	POM-HB
28	PSHX1252Z	PLASTIC PARTS,CORE STOPPER	
29	PSKF1092Y1	CABINET COVER	ABS-V0
30	PSGT2653Y	NAME PLATE(FOR BB-HCM381CE)	
30	PSGT2654Y	NAME PLATE(FOR BB-HCM381E)	
31	PSQT1999Z	LABEL, AC ADAPTOR COUTION	
32	PSQT2000Z	LABEL, FACTORY DEFAULT	
33	PSWEHCM381A	CCD UNIT ASS'Y (RTL)	
33-1	VXW0482-1	LENS NUIT	
33-2	PS0F1001Z	OPTICAL FILTER,LPF	
33-3	PSHG1203Z	CCD RUBBER	
33-4	XQN16+CJ6FJ	SCREW	
34	PSHA1012Z	RUBBER PARTS, LEGS (BIG)	
35	PSHA1013Z	RUBBER PARTS, LEGS (SMALL)	

20.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PFJA02A006Z	POWER CORD(FOR BB-HCM381CE)	
A1	PSJA1106Z	POWER CORD(FOR BB-HCM381E)	
A2	PSWEHCM381CE	AC ADAPTOR(FOR BB-HCM381CE)	
A2	PSWEHCM381E	AC ADAPTOR(FOR BB-HCM381E)	
A3	PSZMHCM381N	MOUNTING BRACKET, CEILING STAY PLATE ASS'Y	
A3-1	PSZMHCM381A	MOUNTING BRACKET, CEILING STAY PLATE 1	
A3-2	PSMD1045Y	MOUNTING BRACKET, CEILING STAY PLATE 2	
A4	PSKL1023Y2	STAND,CEILING ATTACHMENT	
A5	XTB4+20AFJ	SCREW	
A6	XYN3+J6FJ	SCREW	
A7	PSQX3588ZCD	INSTRUCTION BOOK ,CD-ROM	
A8	PSQW2290Z	LEAFLET(FOR BB-HCM381CE)	
A8	PSQW2299Z	LEAFLET(FOR BB-HCM381E)	
A9	PSQW2285Z	LEAFLET	
A10	PSQW2227Z	LEAFLET(FOR BB-HCM381CE)	
A10	PSQW2274Y	LEAFLET(FOR BB-HCM381E)	
A11	PSQW2287Z	LEAFLET(BB-HCM381CE ONLY)	
A12	PSQX3579Z	INSTRUCTION BOOK	
A13	PSQX3586Z	INSTALLATION/TROUBLESHOOTING	
A14	PSJA1105Z	CORD,AUDIO/VIDEO CABLE(EXCLUSIVE)	
A15	PSHR1303Z	COVER, LENS PROTECTION	
P1	PSPK2313Z	GIFT BOX	
P2	PSPN1161Z	ACCESSORY BOX (FOR ACCESSORIES)	
P3	PSPN1163Z	ACCESSORY BOX (FOR SET)	
P4	PSPD1231Z	CUSHION	
P5	PSPD1232Z	CUSHION	
P6	XZB20X30A05	PROTECTION COVER	
P7	XZB05X08A03	PROTECTION COVER(FOR SCREWS)	
P8	PQPH89Z	PROTECTION COVER(FOR SET)	

20.3. MAIN BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PSWP1CM381CE	MAIN BOARD ASS'Y (RTL)	
		(ICS)	
IC101	PSWI1CM381CE	IC	
IC102	C0JBAF000548	IC	
IC103	C1DB00001114	IC	
IC104	C0JBAB000636	IC	
IC105	C3ABPG000134	IC	
IC106	C0EBE0000231	IC	
IC201	C1AB00002063	IC	
IC202	C1CB00001689	IC	
IC203	C0JBAB000633	IC	
IC204	PFVITC74V74T	IC	S
IC206	C0JBAE000332	IC	
IC301	RPI-352	IC	S
IC302	C1CB00001918	IC	
IC303	MN5774	IC	
IC304	C0CBCAD00039	IC	
IC305	C0BBBA000044	IC	
IC401	C0GBF0000021	IC	
IC402	C0FBBD000174	IC	
		(TRANSISTORS)	
Q101	PQVTDTC143E	TRANSISTOR(SI)	S
Q102	PQVTDTA143EU	TRANSISTOR(SI)	S
Q401	PQVTDTC143E	TRANSISTOR(SI)	S
		(DIODES)	
D101	MA3082	DIODE(SI)	S
D301	MA111	DIODE(SI)	S
D302	MA741WK	DIODE(SI)	S
		(CAPACITORS)	
C102	ECUV1A105ZFV	1	
C103	ECJ0EF1C104Z	0.1	
C104	F1J0J1060006	10	
C105	ECJ0EF1C104Z	0.1	
C106	ECJ0EC1H101J	100p	
C107	ECUV1A105ZFV	1	
C109	ECUV1A105ZFV	1	
C110	ECJ0EC1H220J	22p	
C111	ECJ0EF1C104Z	0.1	
C112	ECUV1C104ZFV	0.1	
C114	ECJ0EC1H330J	33p	
C115	ECJ0EC1H200J	20p	
C117	ECJ0EF1C104Z	0.1	
C118	F1J0J1060006	10	
C120	ECJ0EF1C104Z	0.1	
C121	ECJ0EF1C104Z	0.1	
C122	ECUV1C224ZFV	0.22	
C123	ECJ0EF1C104Z	0.1	
C124	ECJ0EF1C104Z	0.1	
C125	ECJ0EF1C104Z	0.1	
C126	ECJ0EF1C104Z	0.1	
C127	ECJ0EF1C104Z	0.1	
C128	ECJ0EF1C104Z	0.1	
C129	ECJ0EF1C104Z	0.1	

[illegible]	[illegible]	[illegible]	

Ref. No.	Part No.	Part Name & Description	Remarks
C130	ECJ0EF1C104Z	0.1	
C131	ECJ0EF1C104Z	0.1	
C132	F1J0J1060006	10	
C133	ECJ0EF1C104Z	0.1	
C134	ECJ0EF1C104Z	0.1	
C135	ECJ0EF1C104Z	0.1	
C136	ECJ0EF1C104Z	0.1	
C137	ECJ0EF1C104Z	0.1	
C138	ECJ0EF1C104Z	0.1	
C139	ECJ0EF1C104Z	0.1	
C140	ECJ0EC1H101J	100p	
C141	ECJ0EF1C104Z	0.1	
C142	ECJ0EF1C104Z	0.1	
C143	ECJ0EF1C104Z	0.1	
C144	ECJ0EF1C104Z	0.1	
C145	ECJ0EF1C104Z	0.1	
C146	ECJ0EF1C104Z	0.1	
C147	ECJ0EF1C104Z	0.1	
C148	ECJ0EF1C104Z	0.1	
C149	ECJ0EF1C104Z	0.1	
C150	ECJ0EF1C104Z	0.1	
C151	ECJ0EF1C104Z	0.1	
C152	ECJ0EF1C104Z	0.1	
C153	ECJ0EF1C104Z	0.1	
C154	ECJ0EF1C104Z	0.1	
C155	ECJ0EF1C104Z	0.1	
C156	ECJ0EF1C104Z	0.1	
C157	ECJ0EF1C104Z	0.1	
C158	ECJ0EF1C104Z	0.1	
C159	ECJ0EF1C104Z	0.1	
C160	ECJ0EF1C104Z	0.1	
C161	ECJ0EF1C104Z	0.1	
C162	ECJ0EF1C104Z	0.1	
C163	ECJ0EF1C104Z	0.1	
C164	ECJ0EF1C104Z	0.1	
C165	ECJ0EF1C104Z	0.1	
C166	ECJ0EF1C104Z	0.1	
C167	ECJ0EF1C104Z	0.1	
C168	ECJ0EF1C104Z	0.1	
C169	ECJ0EF1C104Z	0.1	
C170	ECJ0EF1C104Z	0.1	
C171	ECJ0EF1C104Z	0.1	
C172	F1J0J1060006	10	
C173	F1J0J1060006	10	
C174	ECJ0EC1H220J	22p	
C175	ECJ0EB1H102K	0.001	
C176	ECJ0EC1H101J	100p	
C203	ECUV0J105KBV	1	S
C204	ECUV0J105KBV	1	S
C205	ECJ0EC1H330J	33p	
C206	ECJ0EC1H330J	33p	
C207	ECJ0EC1H221J	220p	
C208	ECJ0EC1H221J	220p	
C209	ECJ0EF1C104Z	0.1	
C210	F1K0J1060020	10	
C211	ECJ0EC1H101J	100p	
C212	ECJ0EC1H101J	100p	

[illegible]	[illegible]	[illegible]	

Ref. No.	Part No.	Part Name & Description	Remarks
C213	ECJ0EF1C104Z	0.1	
C214	ECUV1A105ZFV	1	
C215	ECUV1A105ZFV	1	
C216	ECJ0EF1C104Z	0.1	
C217	F1K0J1060020	10	
C218	ECJ0EF1C104Z	0.1	
C219	F1K0J1060020	10	
C220	F1K0J1060020	10	
C221	ECJ0EF1C104Z	0.1	
C222	F1K0J1060020	10	
C223	ECJ0EF1C104Z	0.1	
C224	ECJ0EF1C104Z	0.1	
C225	ECJ0EC1H101J	100p	
C226	ECJ0EC1H101J	100p	
C227	ECJ0EF1C104Z	0.1	
C228	ECJ0EF1C104Z	0.1	
C229	F1K0J1060020	10	
C230	F1K0J1060020	10	
C231	ECJ0EC1H120J	12p	
C232	ECJ0EC1H150J	15p	
C233	ECJ0EF1C104Z	0.1	
C234	ECJ0EF1C104Z	0.1	
C235	F1J0J1060006	10	
C236	ECJ0EC1H101J	100p	
C237	ECJ0EF1C104Z	0.1	
C238	ECJ0EF1C104Z	0.1	
C239	ECJ0EC1H101J	100p	
C240	F1K0J1060020	10	
C241	ECJ0EF1C104Z	0.1	
C242	ECJ0EC1H101J	100p	
C243	ECJ0EC1H330J	33p	
C244	ECJ0EC1H101J	100p	
C245	ECJ0EF1C104Z	0.1	
C246	ECJ0EF1C104Z	0.1	
C247	ECJ0EC1H101J	100p	
C248	ECUV1C104ZFV	0.1	
C249	ECJ0EF1C104Z	0.1	
C250	ECJ0EF1C104Z	0.1	
C251	ECJ0EF1C104Z	0.1	
C252	ECJ1VC1H040C	4p	
C253	ECJ0EF1C104Z	0.1	
C254	ECJ0EF1C104Z	0.1	
C255	ECJ0EF1C104Z	0.1	
C256	ECJ0EC1H470J	47p	
C257	ECJ0EC1H150J	15p	
C258	ECJ0EC1H330J	33p	
C259	ECJ0EF1C104Z	0.1	
C260	ECJ0EF1C104Z	0.1	
C261	ECJ0EF1C104Z	0.1	
C265	ECJ0EC1H101J	100p	
C266	ECJ0EC1H101J	100p	
C267	ECJ0EC1H101J	100p	
C268	ECUV1H101JCV	100p	
C270	ECJ0EB1H102K	0.001	
C271	ECJ0EF1C104Z	0.1	
C272	ECJ0EC1H101J	100p	
C273	ECJ0EF1C104Z	0.1	

[illegible]	[illegible]	[illegible]	

Ref. No.	Part No.	Part Name & Description	Remarks
C274	ECJ0EC1H101J	100p	
C275	ECJ0EF1C104Z	0.1	
C301	ECUV1C104ZFV	0.1	
C302	ECJ0EF1C104Z	0.1	
C303	ECUV1C104ZFV	0.1	
C304	ECJ0EF1C104Z	0.1	
C305	ECUV1A105ZFV	1	
C306	ECUV1C104ZFV	0.1	
C307	F1J0J1060006	10	
C308	ECJ0EC1H101J	100p	
C309	ECJ0EF1C104Z	0.1	
C310	ECUV1C104ZFV	0.1	
C311	F1J0J1060006	10	
C312	ECJ0EC1H330J	33p	
C313	ECUV0J105KBV	1	S
C314	ECJ0EC1H330J	33p	
C402	ECJ0EF1C104Z	0.1	
C403	ECJ0EF1C104Z	0.1	
C405	ECJ0EC1H101J	100p	
C407	PFCX1EY106ZF	10	S
C409	ECJ0EC1H101J	100p	
C421	ECJ0EF1C104Z	0.1	
C422	ECJ0EF1C104Z	0.1	
C425	ECJ0EC1H101J	100p	
C427	ECJ0EF1C104Z	0.1	
C428	ECJ0EF1C104Z	0.1	
C430	ECJ0EC1H101J	100p	
C431	ECJ0EF1C104Z	0.1	
C432	ECJ0EF1C104Z	0.1	
C433	ECJ0EC1H101J	100p	
C434	ECJ0EF1C104Z	0.1	
C435	ECJ0EF1C104Z	0.1	
C436	ECJ0EC1H101J	100p	
C437	ECJ0EF1C104Z	0.1	
C438	ECJ0EF1C104Z	0.1	
C439	ECJ0EC1H101J	100p	
C440	ECJ0EF1C104Z	0.1	
C441	ECJ0EF1C104Z	0.1	
C442	ECJ0EF1C104Z	0.1	
C443	ECJ0EF1C104Z	0.1	
C444	ECJ0EB1H471K	470p	
C445	ECJ0EF1C104Z	0.1	
C446	ECJ0EB1H471K	470p	
C447	ECJ0EF1C104Z	0.1	
C448	ECUV1A105ZFV	1	
C451	ECJ0EC1H101J	100p	
C452	ECJ0EF1C104Z	0.1	
C453	EEEFK1C101	100	
C454	ECUV1C224ZFV	0.22	
C455	ECJ0EC1H470J	47p	
C456	ECJ0EC1H470J	47p	
C457	ECJ0EC1H470J	47p	
C458	ECJ0EC1H470J	47p	
C459	ECJ0EF1C104Z	0.1	
C460	PFCX1EY106ZF	10	S
C461	ECJ0EF1C104Z	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
		(CONNECTORS)	
CN201	K1KB60A00135	CONNECTOR, 60P	
CN401	K1MN21A00025	CONNECTOR, 21P	
CN402	K1MN17A00035	CONNECTOR, 17P	
CN403	K1KA04BA0086	CONNECTOR, 4P	
		(COILS, CERAMIC FILTERS AND IC FILTERS)	
L101	G1C100K00031	COIL	
L102	PSLQR2S601M	COIL	
L201	PQLQR1RS601T	COIL	S
L202	PQLQR1RS601T	COIL	S
L203	G1C100K00031	COIL	
L204	G1C100K00031	COIL	
L205	G1CR12J00003	COIL	
L206	J0JDC0000076	CERAMIC FILTER	
L207	J0JDC0000076	CERAMIC FILTER	
L208	G1C100K00031	COIL	
L301	PQLQR4F102M	COIL	S
L302	PQLQR4F102M	COIL	S
L303	PQLQR4F102M	COIL	S
L304	PQLQR4F102M	COIL	S
L305	PQLQR4F102M	COIL	S
L306	PQLQR4F102M	COIL	S
L307	PQLQR4F102M	COIL	S
L308	PQLQR4F102M	COIL	S
L401	G1C100M00027	COIL	
L402	PQLQR1KT	COIL	S
L403	PQLQR1KT	COIL	S
R101	PQLQR1RM471	COIL	S
R223	J0JCC0000368	CERAMIC FILTER	
R262	PQLQR4F102M	COIL	S
R307	J0JCC0000370	IC FILTER	
R312	J0JCC0000370	IC FILTER	
R326	J0JCC0000370	IC FILTER	
R403	PQLQR4F102M	COIL	S
R404	PQLQR4F102M	COIL	S
R405	PQLQR4F102M	COIL	S
R406	PQLQR4F102M	COIL	S
R407	PQLQR4F102M	COIL	S
R408	PQLQR4F102M	COIL	S
R409	PQLQR4F102M	COIL	S
R410	PQLQR4F102M	COIL	S
R411	PQLQR4F102M	COIL	S
R412	PQLQR4F102M	COIL	S
R413	PQLQR4F102M	COIL	S
R414	PQLQR4F102M	COIL	S
R415	PQLQR4F102M	COIL	S
R417	PQLQR4F102M	COIL	S
R419	PQLQR4F102M	COIL	S
R420	PQLQR4F102M	COIL	S
R421	PQLQR4F102M	COIL	S
RA201	J0JAD0000007	IC FILTER	
RA202	J0JAD0000007	IC FILTER	
		(RESISTORS)	
R103	ERJ3GEYJ272	2.7k	
R104	ERJ3GEYJ101	100	

[illegible]	[illegible]	[illegible]	

Ref. No.	Part No.	Part Name & Description	Remarks
R105	ERJ2GE0R00	0	
R107	ERJ2GEJ103	10k	
R108	ERJ3GEYJ103	10k	
R109	ERJ2GEJ473	47k	
R110	ERJ2GEJ103	10k	
R112	ERJ2GEJ103	10k	
R113	ERJ2GEJ103	10k	
R114	ERJ2GEJ103	10k	
R116	ERJ2GEJ103	10k	
R117	ERJ2GEJ103	10k	
R119	ERJ2GEJ103	10k	
R120	ERJ2GEJ103	10k	
R122	ERJ2GEJ101	100	
R123	ERJ2GEJ105X	1M	
R124	ERJ2GEJ103	10k	
R126	ERJ2GEJ101	100	
R127	ERJ2GE0R00	0	
R128	ERJ3GEYJ271	270	
R129	ERJ2GEJ473	47k	
R130	ERJ2GEJ473	47k	
R131	ERJ2GEJ473	47k	
R132	ERJ2GEJ473	47k	
R133	ERJ3GEYJ330	33	
R134	ERJ2GEJ102	1k	
R135	ERJ2GEJ103	10k	
R201	ERJ2GEJ470	47	
R202	ERJ2GEJ470	47	
R203	ERJ2GEJ470	47	
R204	ERJ2GEJ470	47	
R205	ERJ2GEJ470	47	
R206	ERJ2GEJ470	47	
R207	ERJ2GEJ152	1.5k	
R208	ERJ2GEJ822	8.2k	
R209	ERJ2GEJ222	2.2k	
R210	ERJ2GEJ103	10k	
R211	ERJ2GEJ101	100	
R212	ERJ2GEJ101	100	
R213	ERJ2GEJ103	10k	
R214	ERJ2GEJ102	1k	
R215	ERJ2GEJ103	10k	
R217	ERJ2GEJ103	10k	
R218	ERJ2GEJ103	10k	
R219	ERJ2GEJ103	10k	
R220	ERJ2GEJ103	10k	
R222	ERJ2GEJ103	10k	
R224	ERJ2GEJ103	10k	
R225	ERJ3EKF1202	12k	
R226	ERJ2GEJ103	10k	
R227	ERJ2GEJ103	10k	
R228	ERJ2GEJ103	10k	
R229	ERJ2GEJ103	10k	
R230	ERJ2GE0R00	0	
R231	ERJ2GE0R00	0	
R232	ERJ2GE0R00	0	
R233	ERJ3EKF1541	1.54k	
R234	ERJ3EKF1001	1k	
R235	ERJ3EKF51R1	1.1	

[redacted]	[redacted]	[redacted]	

Ref. No.	Part No.	Part Name & Description	Remarks
R236	ERJ3EKF51R1	1.1	
R237	ERJ3EKF56R2	56.2	
R238	ERJ3EKF56R2	56.2	
R239	PQ4R10XJ330	33	S
R240	ERJ2GEJ105X	1M	
R241	ERJ2GEJ101	100	
R242	ERJ2GEJ102	1k	
R243	ERJ2GE0R00	0	
R244	ERJ2GE0R00	0	
R245	ERJ2GE0R00	0	
R246	ERJ2GE0R00	0	
R255	ERJ2GE0R00	0	
R256	ERJ2GE0R00	0	
R257	ERJ2GE0R00	0	
R258	ERJ2GE0R00	0	
R259	ERJ2GE0R00	0	
R260	ERJ2GE0R00	0	
R301	ERJ3GEYJ101	100	
R302	ERJ2GEJ103	10k	
R304	ERJ2GEJ332	3.3k	
R305	ERJ2GEJ103	10k	
R308	ERJ2GE0R00	0	
R309	ERJ2GE0R00	0	
R310	ERJ2GEJ103	10k	
R311	ERJ2GEJ103	10k	
R313	ERJ2GEJ472X	4.7k	
R314	ERJ2GE0R00	0	
R315	ERJ2GE0R00	0	
R316	ERJ2GEJ104	100k	
R317	ERJ2GEJ103	10k	
R318	ERJ2GEJ472X	4.7k	
R319	ERJ2GEJ104	100k	
R320	ERJ2GE0R00	0	
R321	ERJ2GEJ103	10k	
R322	ERJ2GEJ103	10k	
R323	ERJ2GEJ103	10k	
R324	ERJ2GEJ103	10k	
R325	ERJ2GEJ103	10k	
R327	ERJ2GEJ101	100	
R401	ERJ2GE0R00	0	
R402	ERJ2GE0R00	0	
R416	ERJ2GEJ103	10k	
R418	ERJ2GEJ103	10k	
R422	ERJ2GEJ103	10k	
R423	ERJ2GEJ103	10k	
R424	ERJ2GEJ103	10k	
R425	ERJ2GEJ563	56k	
R426	ERJ2GEJ103	10k	
R427	ERJ2GEJ563	56k	
R428	ERJ2GEJ103	10k	
R429	ERJ14BQF1R5	1.5	
R430	ERJ14BQF1R5	1.5	
R431	ERJ3GEY0R00	0	
R432	ERJ3GEY0R00	0	
R433	ERJ3GEY0R00	0	
R434	ERJ3GEY0R00	0	
R435	ERJ3EKF2702	27k	

Ref. No.	Part No.	Part Name & Description	Remarks
R436	ERJ3EKF1102	11k	
R437	ERJ2GEJ000	0	S
		(COMPONENT PARTS)	
RA203	D1H84704A024	RESISTOR ARRAY	
RA204	D1H84704A024	RESISTOR ARRAY	
RA301	D1H84704A024	RESISTOR ARRAY	
RA302	D1H84704A024	RESISTOR ARRAY	
RA303	D1H84704A024	RESISTOR ARRAY	
RA304	D1H84704A024	RESISTOR ARRAY	
RA305	D1H84704A024	RESISTOR ARRAY	
RA306	D1H84704A024	RESISTOR ARRAY	
RA307	D1H81034A024	RESISTOR ARRAY	
		(SWITCH)	
SW101	K0H1BA000401	SWITCH	
		(CRYSTAL OSCILLATORS)	
X101	H0J163500014	CRYSTAL OSCILLATOR	
X201	H0J250500038	CRYSTAL OSCILLATOR	
X202	H0J245500055	CRYSTAL OSCILLATOR	
		(OTHER)	
E1	PSHR1290Z	SPACER	ABS-V0

20.4. TILT BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PSWP2HCM381N	TILT BOARD ASS'Y (RTL)	
		(ICS)	
IC2	C0DBAZH00009	IC	
IC3	RPI-352	IC	S
IC4	B1LBZ0000022	IC	
IC5	C0CBADD00009	IC	
		(TRANSISTORS)	
IC1	B1DHCD000018	TRANSISTOR(SI)	
Q1	PQVTDTC143E	TRANSISTOR(SI)	S
Q2	B1DHAC000002	TRANSISTOR(SI)	
		(DIODES)	
D1	MA736	DIODE(SI)	S
D2	MA2Z72000	DIODE(SI)	
D3	MA2Z72000	DIODE(SI)	
D4	MA2Z72000	DIODE(SI)	
D5	MA2Z72000	DIODE(SI)	
		(CAPACITORS)	
C1	ECJ2VF1C105Z	1	
C2	ECUV1A105ZFV	1	
C3	PFCX1EY106ZF	10	S
C4	ECJ0EF1C104Z	0.1	
C5	ECJ0EC1H101J	100p	
C6	ECUV1A105ZFV	1	

Ref. No.	Part No.	Part Name & Description	Remarks
C7	ECUV1E104ZFV	0.1	
C8	ECJ1VC1H471J	470p	
C9	PFCX1EY106ZF	10	S
C10	ECJ1VC1H471J	470p	
C11	ECUV1H331JCV	330p	S
C12	ECJ1VB1H221K	220p	
C13	ECUV1E104ZFV	0.1	
C16	ECUV1H220JCV	22p	
C17	F4Z0K3360001	33	
C18	ECJ0EC1H101J	100p	
C19	ECUV1E104ZFV	0.1	
C20	ECUV1E104ZFV	0.1	
C21	F2G1C4700016	47	
C22	ECJ1VB1H472K	0.0047	
C23	ECJ1VB1H472K	0.0047	
C24	ECUV1E104ZFV	0.1	
C25	F1K0J1060020	10	
C26	ECUV1H470JCV	47p	
C27	ECUV1H470JCV	47p	
C28	ECUV1H470JCV	47p	
C29	ECUV1H470JCV	47p	
		(CONNECTORS)	
CN1	K1MN17A00035	CONNECTOR, 17P	
CN2	K1MN21A00025	CONNECTOR, 21P	
CN3	K1MN21B00061	CONNECTOR, 21P	
CN4	K1KA04BA0086	CONNECTOR, 4P	
		(COILS)	
L1	G1C100M00027	COIL	
L2	G1C470ZA0012	COIL	
L3	G1C100M00027	COIL	
L4	J0JCC0000192	COIL	
L5	J0JCC0000192	COIL	
L6	J0JCC0000192	COIL	
L7	J0JCC0000192	COIL	
		(RESISTORS)	
R1	ERJ3GEYJ223	22k	
R2	ERJ3GEYJ333	33k	
R3	ERJ14BSFR10	0.1	
R4	ERJ3GEYJ684	680k	
R5	ERJ3GEYJ153	15k	
R6	ERJ3GEY0R00	0	
R7	ERJ3GEYJ101	100	
R8	ERJ3GEYJ101	100	
R9	ERJ3GEYJ563	56k	
R10	ERJ3GEYJ563	56k	
R11	ERJ3GEYJ682	6.8k	
R12	ERJ3EKF6803	680k	
R13	ERJ3EKF1133	113k	
R14	ERJ3GEYJ102	1k	
R15	ERJ3GEYJ102	1k	
R16	ERJ14BQF1R5	1.5	
R17	ERJ14BQF1R5	1.5	
R18	ERJ3GEYJ563	56k	
R19	ERJ3GEYJ101	100	

Ref. No.	Part No.	Part Name & Description	Remarks
R20	ERJ3GEYJ101	100	

20.5. LENS BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PSWP3HCM381N	LENS BOARD ASS'Y (RTL)	
		(ICS)	
IC1001	C0GBB0000029	IC	
IC1002	C0GBB0000029	IC	
IC1007	C0ABBA000166	IC	
IC1008	C0FBBD000102	IC	
IC1009	C3EBGC000045	IC	
IC1010	C0ABBB000220	IC	
IC1011	C0CBADC00044	IC	
		(TRANSISTORS)	
Q1001	2SD0601ASL	TRANSISTOR(SI)	
Q1002	UN9211	TRANSISTOR(SI)	S
Q1003	B1HDGFA00001	TRANSISTOR(SI)	
Q1004	B1HDGFA00001	TRANSISTOR(SI)	
Q1005	B1HDGFA00001	TRANSISTOR(SI)	
Q1006	B1HDGFA00001	TRANSISTOR(SI)	
Q1007	PQVTDTC143E	TRANSISTOR(SI)	S
Q1008	PQVTDTC143E	TRANSISTOR(SI)	S
		(DIOEDS)	
LED100	B3AGB0000039	LED	
		(CAPACITORS)	
C1001	ECUV1A105ZFV	1	
C1002	ECUV1A105ZFV	1	
C1003	ECUV1A105ZFV	1	
C1004	ECUV1C104ZFV	0.1	
C1005	ECUV1C104ZFV	0.1	
C1006	ECUV1A105ZFV	1	
C1007	ECST0JY106	10	S
C1008	ECUV1C104ZFV	0.1	
C1010	ECUV1C104ZFV	0.1	
C1011	ECUV1H332KBV	0.0033	
C1012	ECUV1A105ZFV	1	
C1013	ECUV1H332KBV	0.0033	
C1014	ECUV1C104ZFV	0.1	
C1015	ECST0JY106	10	S
C1016	ECUV1C104ZFV	0.1	
C1017	ECUV1C104ZFV	0.1	
C1018	F3H1A476A004	47	
C1020	ECUV1C104ZFV	0.1	
C1021	ECUV1C104ZFV	0.1	
C1023	ECUV1A105ZFV	1	
C1024	ECUV1C224KBV	0.22	
C1025	ECUV1C104ZFV	0.1	
C1026	ECUV1C104ZFV	0.1	
C1027	ECUV1H102KBV	0.001	
C1028	ECUV1H222KBV	0.0022	

Ref. No.	Part No.	Part Name & Description	Remarks
C1029	PQCUV1A105KB	1	S
C1030	ECUV1C104ZFV	0.1	
C1031	ECUV1C104ZFV	0.1	
C1032	ECUV1C104KBV	0.1	
C1034	ECUV1A105ZFV	1	
C1035	ECUV1A105ZFV	1	
C1036	ECUV1A105ZFV	1	
		(CONNECTORS)	
CN1001	K1MN21B00061	CONNECTOR, 21P	
CN1002	K1MN18B00100	CONNECTOR, 18P	
		(COILES)	
L1001	ELJFC6R8KF	COIL	
L1002	ELJFC6R8KF	COIL	
L1003	ELJPA100KF	COIL	
		(RESISTORS)	
R1001	ERJ3GEYJ473	47k	
R1002	ERJ3GEYJ473	47k	
R1003	ERJ3GEYJ3R3	3.3	
R1004	ERJ3GEYJ3R3	3.3	
R1005	ERJ3GEYJ3R3	3.3	
R1006	ERJ3GEYJ3R3	3.3	
R1007	ERJ3GEYJ102	1k	
R1008	ERJ3GEYJ471	470	
R1009	ERJ3GEYJ101	100	
R1010	ERJ3GEYJ123	12k	
R1011	ERJ3GEYJ123	12k	
R1012	ERJ3GEYJ183	18k	
R1013	ERJ3EKF6802	68k	
R1014	ERJ3GEYJ682	6.8k	
R1015	ERJ3EKF3302	33k	
R1016	ERJ3GEYJ223	22k	
R1017	ERJ3GEYJ153	15k	
R1018	ERJ3GEYJ152	1.5k	
R1019	ERJ3GEYJ824	820k	
R1021	ERJ3GEYJ392	3.9k	
R1022	ERJ3GEYJ334	330k	
R1023	ERJ3GEYJ334	330k	
R1024	ERJ3GEYJ273	27k	
R1025	ERJ3GEYJ333	33k	
R1026	ERJ3EKF6801	6.8k	
R1027	ERJ3GEYJ684	680k	
R1028	ERJ3GEYJ103	10k	
R1029	ERJ3EKF1001	1k	
R1030	ERJ3EKF1002	10k	
R1031	ERJ3GEYJ472	4.7k	
R1032	ERJ3GEYJ154	150k	
R1033	ERJ3GEYJ472	4.7k	
R1034	ERJ3GEYJ102	1k	
R1035	ERJ3GEYJ151	150	
R1036	ERJ3GEYJ473	47k	
R1037	ERJ3GEYJ151	150	

20.6. VIDEO BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	PSWP4CM381CE	VIDEO BOARD ASS'Y (RTL)	
		(ICS)	
IC801	C1AB00002190	IC	
IC802	C1AB00002188	IC	
IC803	C1AB00002189	IC	
IC805	C0JBAB000636	IC	
IC902	PSWI2HCM381A	IC	
IC1152	PQVIC68B102M	IC	S
IC1153	C0DBAGC00014	IC	
		(TRANSISTORS)	
Q801	2SB1218A	TRANSISTOR(SI)	S
Q802	2SB1218A	TRANSISTOR(SI)	S
Q1151	2SB1218A	TRANSISTOR(SI)	S
Q1152	B1CFMD000004	TRANSISTOR(SI)	
Q1153	B1DHAC000002	TRANSISTOR(SI)	
		(DIODES)	
D801	MA111	DIODE(SI)	S
D1151	MA720	DIODE(SI)	S
D1152	MA720	DIODE(SI)	S
D1153	MA720	DIODE(SI)	S
D1154	MA736	DIODE(SI)	S
D1155	MA111	DIODE(SI)	S
D1156	MA3051	DIODE(SI)	
DA901	MA133	DIODE(SI)	S
		(CAPACITORS)	
C801	ECJ0EB1E472K	0.0047	
C802	ECJ0EB1E472K	0.0047	
C803	ECJ1VF1H104Z	0.1	
C804	ECJ0EF1C104Z	0.1	
C805	ECJ0EF1C104Z	0.1	
C806	ECJ0EF1C104Z	0.1	
C807	F1J1C1050014	1	
C808	ECST0JY226	22	S
C809	ECJ0EB1C223K	0.022	
C810	ECUV0J105KBV	1	S
C811	ECJ0EF1C104Z	0.1	
C812	ECJ0EF1C104Z	0.1	
C813	ECJ0EF1C104Z	0.1	
C814	ECJ0EF1C104Z	0.1	
C815	ECUV1E105KB	1	S
C816	ECJ0EF1C104Z	0.1	
C817	ECJ0EF1C104Z	0.1	
C818	ECJ2VF1C105Z	1	
C819	ECJ0EF1C104Z	0.1	
C820	F1J1A3350001	3.3	
C821	ECJ0EF1C104Z	0.1	
C822	ECJ0EF1C104Z	0.1	
C823	ECST0JY106	10	S
C824	ECJ0EF1C104Z	0.1	
C825	ECJ0EF1C104Z	0.1	
C826	ECJ0EF1C104Z	0.1	
C827	ECJ0EF1C104Z	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C828	ECST0JY226	22	S
C829	ECJ0EF1C104Z	0.1	
C830	ECJ0EF1C104Z	0.1	
C831	ECJ0EF1C104Z	0.1	
C832	ECJ0EC1H150J	15p	
C833	ECJ0EC1H150J	15p	
C834	ECJ0EF1C104Z	0.1	
C835	ECJ0EF1C104Z	0.1	
C836	ECJ0EF1C104Z	0.1	
C837	F1H0G4750001	4.7	
C838	F1H0G4750001	4.7	
C839	ECUV1A105ZFV	1	
C840	ECJ0EF1C104Z	0.1	
C841	ECJ0EF1C104Z	0.1	
C842	ECJ0EF1C104Z	0.1	
C843	ECST0JX476	47	S
C844	ECJ0EF1C104Z	0.1	
C846	ECJ0EC1H820J	82p	
C901	ECUV1A105ZFV	1	
C902	ECUV1A105ZFV	1	
C903	ECJ0EC1H101J	100p	
C904	ECUV1A105ZFV	1	
C905	ECJ0EC1H101J	100p	
C906	ECJ2VF1C105Z	1	
C907	ECJ0EC1H101J	100p	
C908	ECUV1A105ZFV	1	
C909	ECJ0EC1H101J	100p	
C910	ECJ0EC1H101J	100p	
C911	ECJ0EC1H101J	100p	
C912	ECJ0EC1H101J	100p	
C913	ECJ0EC1H101J	100p	
C914	ECJ0EC1H150J	15p	
C915	ECJ0EC1H150J	15p	
C916	ECJ0EF1C104Z	0.1	
C917	ECST0JY226	22	S
C918	ECJ0EF1C104Z	0.1	
C919	ECJ0EF1C104Z	0.1	
C920	ECJ0EF1C104Z	0.1	
C921	ECST1AX226	22	S
C922	ECJ0EF1C104Z	0.1	
C923	PQCUV1A105KB	1	S
C924	ECJ0EC1H101J	100p	
C925	ECJ0EC1H101J	100p	
C926	ECJ0EC1H101J	100p	
C927	ECJ0EC1H101J	100p	
C928	ECJ0EC1H101J	100p	
C929	ECJ0EC1H101J	100p	
C930	ECJ0EC1H101J	100p	
C931	ECUV1A105ZFV	1	
C932	ECJ0EC1H101J	100p	
C933	ECUV1A105ZFV	1	
C934	ECJ0EC1H101J	100p	
C935	ECJ0EC1H101J	100p	
C936	ECJ0EC1H101J	100p	
C937	ECUV1A105ZFV	1	
C938	ECJ0EC1H101J	100p	
C939	ECJ0EC1H101J	100p	

Ref. No.	Part No.	Part Name & Description	Remarks
C940	ECJ0EC1H101J	100p	
C941	ECJ0EC1H101J	100p	
C942	ECJ0EF1C104Z	0.1	
C1151	ECJ0EF1C104Z	0.1	
C1152	ECST1AX226	22	S
C1153	F1K1C475A043	4.7	
C1157	F1K1C475A043	4.7	
C1158	ECJ0EF1C104Z	0.1	
C1159	F1K1C475A043	4.7	
C1160	ECJ0EF1C104Z	0.1	
C1161	ECJ0EC1H151J	150p	
C1162	F1K1C475A043	4.7	
C1163	F4Z0J4760001	47	
C1164	ECJ0EF1C104Z	0.1	
C1165	ECJ0EF1C104Z	0.1	
C1166	ECJ0EF1C104Z	0.1	
C1167	F1K1C475A043	47	
C1168	F1K0J1060020	10	
C1169	ECJ0EF1C104Z	0.1	
C1170	ECUV1C225KB	2.2	S
		(CONNECTORS)	
CN801	K1MN21B00061	CONNECTOR, 21P	
CN902	K1MN21B00061	CONNECTOR, 21P	
CN904	K1MN21B00061	CONNECTOR, 21P	
		(COILS AND CERAMIC FILTERS)	
L801	G1C100KA0066	COIL	
L802	G1C100KA0066	COIL	
L803	G1C100KA0066	COIL	
L804	G1C100KA0066	COIL	
L808	J0E1003B0001	CERAMIC FILTER	
L809	J0E3584B0021	CERAMIC FILTER	
L1151	G1C150KA0100	COIL	
L1152	PSLQR2D221M	COIL	
L1153	G1C100ZA0012	COIL	
L1154	ELJFC220KF	COIL	
L1155	ELJFC220KF	COIL	
L1156	G1C100K00031	COIL	
		(RESISTORS AND CERAMIC FILTERS)	
R801	ERJ2GEJ333	33k	
R802	ERJ2GEJ104	100k	
R804	ERJ2GE0R00	0	
R806	ERJ2GE0R00	0	
R807	ERJ2GE0R00	0	
R808	ERJ2GE0R00	0	
R809	ERJ2GEJ330	33	
R810	ERJ2GEJ330	33	
R812	PSLQR2K060H	CERAMIC FILTER	
R813	J0JCC0000002	CERAMIC FILTER	
R814	ERJ2GEJ101	100	
R815	ERJ2GEJ101	100	
R816	ERJ2GEJ101	100	
R817	PSLQR2K060H	CERAMIC FILTER	
R818	ERJ2GE0R00	0	S
R819	ERJ2GEJ101	100	

[redacted]			

Ref. No.	Part No.	Part Name & Description	Remarks
R820	ERJ2GE0R00	0	S
R821	ERJ2GE0R00	0	S
R822	ERJ2GE0R00	0	S
R823	ERJ2GE0R00	0	S
R824	ERJ2GE0R00	0	S
R825	ERJ2GE0R00	0	S
R826	ERJ2GEJ104	100k	
R827	ERJ2GEJ101	100	
R828	ERJ2GEJ330	33	
R829	ERJ2GEJ330	33	
R830	ERJ2GEJ330	33	
R831	ERJ2GEJ105X	1M	
R832	ERJ2GEJ561	560	
R833	ERJ2GEJ103	10k	
R834	ERJ3EKF3901	3.9k	
R835	ERJ2GEJ823	82k	
R837	ERJ3EKF3300	330	
R838	ERJ3EKF5601	5.6k	
R839	ERJ3EKF1201	1.2k	
R840	D1BA1001A015	1k	
R841	ERJ2GEYF391	390	
R842	ERJ2GEYF391	390	
R845	D1BA1001A015	1k	
R846	D1BA1001A015	1k	
R847	ERJ2GEYF391	390	
R848	ERJ2GEYF391	390	
R850	D1BA1001A015	1k	
R901	ERJ3GEY0R00	0	
R902	ERJ3GEY0R00	0	
R904	ERJ2GEJ330	33	
R905	ERJ2GEJ330	33	
R906	ERJ2GEJ103	10k	
R907	ERJ2GEJ103	10k	
R908	ERJ2GEJ103	10k	
R909	ERJ2GEJ103	10k	
R910	ERJ2GEJ330	33	
R911	ERJ2GEJ330	33	
R912	ERJ2GEJ330	33	
R913	ERJ2GE0R00	0	S
R914	ERJ2GEJ330	33	
R915	ERJ2GEJ330	33	
R916	ERJ2GEJ330	33	
R918	ERJ2GEJ103	10k	
R919	ERJ2GEJ103	10k	
R921	ERJ2GEJ103	10k	
R922	ERJ2GEJ103	10k	
R923	ERJ2GE0R00	0	S
R924	ERJ2GEJ103	10k	
R925	ERJ2GEJ103	10k	
R926	ERJ2GEJ103	10k	
R927	ERJ2GEJ103	10k	
R928	ERJ2GEJ103	10k	
R929	ERJ2GEJ330	33	
R930	ERJ2GEJ330	33	
R931	ERJ2GEJ330	33	
R932	ERJ2GEJ103	10k	
R933	ERJ3EKF5602	56k	

Ref. No.	Part No.	Part Name & Description	Remarks
R934	ERJ2GEJ103	10k	
R935	ERJ2GEJ330	33	
R936	ERJ2GEJ330	33	
R937	ERJ2GEJ330	33	
R938	ERJ2GEJ103	10k	
R939	ERJ2GEJ330	33	
R940	ERJ2GEJ330	33	
R941	ERJ2GEJ330	33	
R942	ERJ2GEJ330	33	
R943	ERJ2GEJ471	470	
R944	ERJ2GEJ330	33	
R1153	ERJ3EKF1103	110k	
R1154	ERJ3EKF1002	10k	
R1155	ERJ2GEJ152	1.5k	
R1156	D1BA1001A015	1k	
R1157	ERJ2GEJ103	10k	
		(COMPONENT PARTS)	
RA801	D1H83304A024	RESISTOR ARRAY	
RA802	D1H83304A024	RESISTOR ARRAY	
		(CRYSTAL OSCILLATORS)	
X801	PSVCC0006D	CRYSTAL OSCILLATOR	S
X901	PSVCC0031GT	CRYSTAL OSCILLATOR	S

20.7. CCD UNIT PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	PSWP5HCM381A	CCD BOARD ASS'Y (RTL)	
		(ICS)	
IC1101	PSWP5HCM381A	IF IC1101 NEEDS TO BE REPLACED, PCB5 MUST BE REPLACED.	
		(TRANSISTORS)	
Q1101	2SC39310DL	TRANSISTOR(SI)	
		(CAPACITORS)	
C1101	ECUV1E104ZFV	0.1	
C1102	ECUV1H102KBV	0.001	
C1103	ECUV1H222KBV	0.0022	
C1104	F1K1C475A043	4.7	
C1105	ECUV1H103KBV	0.01	
C1106	F1K1C475A043	4.7	
C1107	ECJ1VB1H472K	0.0047	
		(CONNECTOR)	
CN1101	K1MN21B00061	CONNECTOR,21P	
		(COIL)	
L1101	G1C100KA0066	COIL	
		(RESISTORS)	
R1102	ERJ3GEYJ105	1M	
R1103	ERJ3GEYJ472	4.7k	
R1104	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
R1105	ERJ3GEY0R00	0	
R1106	ERJ3GEYJ151	150	

20.8. I/O BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB6	PSWP6CM381CE	I/O BOARD ASS'Y (RTL)	
		(ICS)	
IC501	C1CB00001622	IC	
IC502	AN6123MS	IC	
IC601	C0DBAFZ00054	IC	
		(TRANSISTORS)	
Q501	PQVTDTA143EU	TRANSISTOR(SI)	S
Q502	PQVTDTA143EU	TRANSISTOR(SI)	S
Q503	B1GBGFCJ0002	TRANSISTOR(SI)	
Q601	B1DHCD000018	TRANSISTOR(SI)	
		(DIODES)	
D601	MA736	DIODE(SI)	S
D602	MA736	DIODE(SI)	S
DA501	MA143A	DIODE(SI)	S
DA502	MA143A	DIODE(SI)	S
DA503	MA143A	DIODE(SI)	S
		(BATTERY)	
BAT501	BR12251VC	LITHUM BATTERY	S
		(CAPACITORS)	
C501	ECUV1C104ZFV	0.1	
C502	ECST0JX476	47	S
C503	ECUV1H121JCV	120p	
C504	ECUV1C104ZFV	0.1	
C505	ECUV1C104ZFV	0.1	
C507	PQCUV1A105KB	1	S
C508	ECUV1C104ZFV	0.1	
C509	ECUV1C473KBV	0.047	
C510	ECUV1E104ZFV	0.1	
C511	ECUV1C104ZFV	0.1	
C512	F1J0J1060006	10	
C513	ECUV1E104ZFV	0.1	
C514	ECUV1C104ZFV	0.1	
C515	ECUV1C104ZFV	0.1	
C516	F1J0J1060006	10	
C517	ECUV1A224KBV	0.22	S
C518	ECUV1E104ZFV	0.1	
C519	ECUV1C104ZFV	0.1	
C520	ECUV1C104ZFV	0.1	
C521	ECUV0J105KBV	1	S
C523	ECUV0J105KBV	1	S
C524	ECUV0J105KBV	1	S
C525	ECUV0J105KBV	1	S
C526	ECUV0J105KBV	1	S
C527	ECUV1C473KBV	0.047	
C528	ECUV1H331JCV	330p	

Ref. No.	Part No.	Part Name & Description	Remarks
C529	ECUV0J105KBV	1	S
C530	ECUV1H102KBV	0.001	
C531	F1J0J1060006	10	
C532	ECUV1C104ZFV	0.1	
C533	ECUV1C474KBV	0.47	
C534	ECUV1H122KBV	0.0012	
C535	ECUV0J105KBV	1	S
C537	ECUV1C104ZFV	0.1	
C542	F1J0J1060006	10	
C547	ECUV1C104ZFV	0.1	
C549	ECUV0J105KBV	1	S
C550	ECUV1C104ZFV	0.1	
C551	ECUV1C104ZFV	0.1	
C552	ECUV1C104ZFV	0.1	
C553	ECUV1C104ZFV	0.1	
C554	ECUV1C104ZFV	0.1	
C555	ECUV1C104ZFV	0.1	
C556	ECUV1C104ZFV	0.1	
C557	ECUV1C104ZFV	0.1	
C558	ECUV1C104ZFV	0.1	
C559	ECUV1H121JCV	120p	
C560	F1K0J1060020	10	
C561	ECJ0EC1H100D	10p	
C562	ECJ0EC1H100D	10p	
C601	ECUV1C104ZFV	0.1	
C602	ECUV1C104ZFV	0.1	
C603	ECUV1C104ZFV	0.1	
C604	ECUV1C104ZFV	0.1	
C605	ECUV1C104ZFV	0.1	
C606	ECUV1C104ZFV	0.1	
C607	ECUV1C104ZFV	0.1	
C608	ECUV1C104ZFV	0.1	
C609	ECUV1C104ZFV	0.1	
C610	PFCX1EY106ZF	10	S
C611	ECUV1C104ZFV	0.1	
C612	PFCX1EY106ZF	10	S
C613	F2A1C4720033	4700	
C615	ECUV1E103KBV	0.01	
C616	F4Z0J4760001	47	
C617	ECUV1C104ZFV	0.1	
C618	F1J0J1060006	10	
C619	ECUV1C104ZFV	0.1	
C620	ECUV1C104ZFV	0.1	
C621	ECUV1C104ZFV	0.1	
C622	ECUV1C104ZFV	0.1	
C623	ECUV1C104ZFV	0.1	
		(CONNECTORS AND JACKS)	
CN501	K4BC06B00047	JACK, EXTERNAL I/O	
CN502	K1KA60A00159	CONNECTOR, 60P	
CN503	K1NA09E00022	CONNECTOR, 9P	
CN504	K2HC104B0024	JACK,AV TERMINAL	
CN505	N5HBZ0000027	CONNECTOR, 8P	
CN601	PFJJ1B01Z	JACK,DC IN	S
		(FUSE)	
F501	D4FBR200A003	FUSE	

[illegible]	[illegible]	[illegible]	

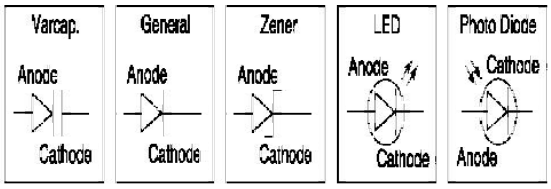
Ref. No.	Part No.	Part Name & Description	Remarks
		(COILS, CERAMIC FILTERS AND IC FILTER)	
L501	J0JCC0000079	CERAMIC FILTER	
L502	J0JCC0000079	CERAMIC FILTER	
L503	J0MAB0000185	IC FILTER	
L504	J0JCC0000079	CERAMIC FILTER	
L505	J0JCC0000079	CERAMIC FILTER	
L506	J0JCC0000079	CERAMIC FILTER	
L507	G1C100K00031	COIL	
L508	J0MAB0000185	IC FILTER	
L510	J0JCC0000079	CERAMIC FILTER	
L511	G1C100K00031	COIL	
L601	G0B150G00001	COIL	
L602	G1C6R8Z00005	COIL	
L603	G1C220ZA0011	COIL	
L604	G1C100M00027	COIL	
R502	J0JCC0000079	CERAMIC FILTER	
R503	J0JCC0000079	CERAMIC FILTER	
R504	J0JCC0000079	CERAMIC FILTER	
		(RESISTORS)	
R501	ERJ3GEYJ222	2.2k	
R505	ERJ3GEYJ102	1k	
R506	ERJ3GEYJ561	560	
R508	ERJ3GEYJ103	10k	
R509	PQ4R18XJ100	10	S
R511	ERJ3GEYJ103	10k	
R512	ERJ3GEYJ103	10k	
R513	ERJ3GEYJ473	47k	
R514	ERJ3GEYJ203	20k	
R515	ERJ3GEYJ154	150k	
R516	ERJ3GEYJ101	100	
R517	ERJ3GEYJ105	1M	
R518	ERJ3GEYJ332	3.3k	
R519	ERJ3GEYJ203	20k	
R520	ERJ3GEYJ103	10k	
R521	ERJ3GEYJ122	1.2k	
R522	ERJ3GEYJ470	47	
R523	ERJ3GEYJ470	47	
R524	ERJ3GEYJ470	47	
R525	ERJ3GEYJ470	47	
R526	ERJ3GEYJ470	47	
R527	ERJ3GEYJ470	47	
R528	ERJ3GEYJ470	47	
R529	ERJ3GEYJ470	47	
R530	ERJ3GEY0R00	0	
R601	ERJ3GEYJ100	10	
R602	ERJ3GEYJ470	47	
R603	ERJ3GEY0R00	0	
R604	ERJ3EKF4702	47k	
R605	ERJ3EKF2002	20k	
R606	ERJ3GEYJ272	2.7k	
		(VARISTORS)	
SA501	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA502	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA504	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	

Ref. No.	Part No.	Part Name & Description	Remarks
SA505	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA507	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA508	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	
SA510	D4ZZ00000024	VARISTOR (SAUGE ABSORBER)	

21. FOR THE SCHEMATIC DIAGRAM

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.



Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of there components, use only manufacturer's specified parts.

22. SCHEMATIC DIAGRAM

22.1. WAVEFORM

23. CIRCUIT BOARD

23.1. MAIN BOARD (COMPONENT VIEW)

23.2. MAIN BOARD (BOTTOM VIEW)

23.3. TILT BOARD (COMPONENT VIEW)

23.4. TILT BOARD (BOTTOM VIEW)

23.5. LENS BOARD (COMPONENT VIEW)

23.6. LENS BOARD (BOTTOM VIEW)

23.7. VIDEO BOARD (COMPONENT VIEW)

23.8. VIDEO BOARD (BOTTOM VIEW)

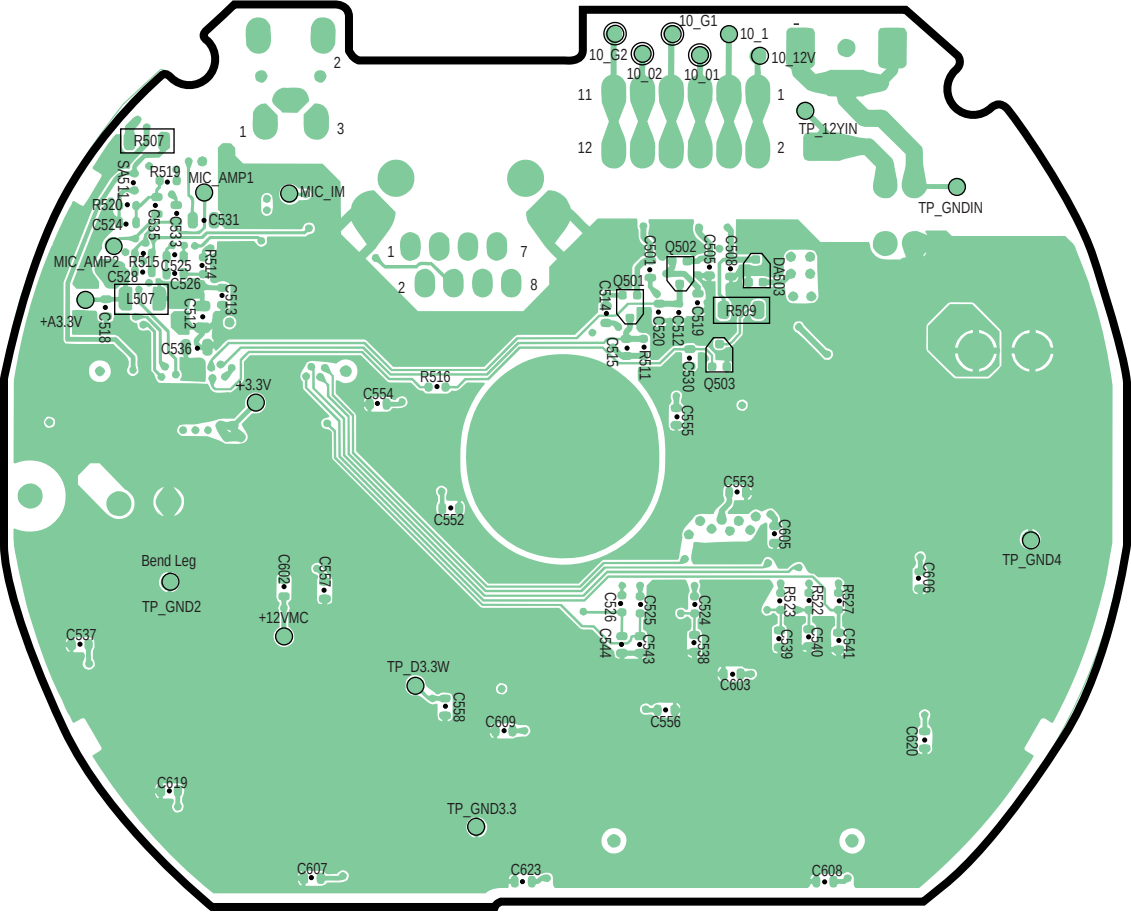
23.9. CCD BLOCK (COMPONENT VIEW)

23.10. CCD BLOCK (BOTTOM VIEW)

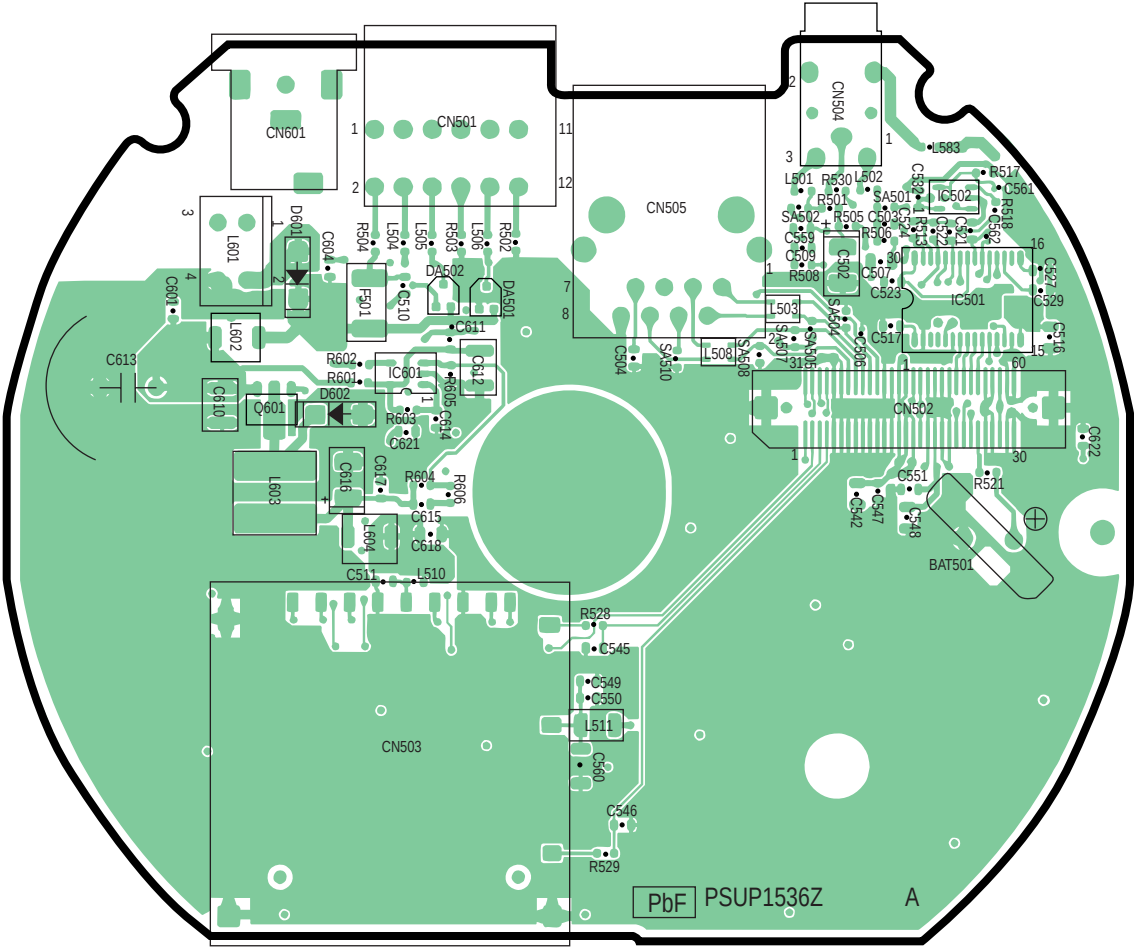
23.11. I/O BOARD (COMPONENT VIEW)

23.12. I/O BOARD (BOTTOM VIEW)

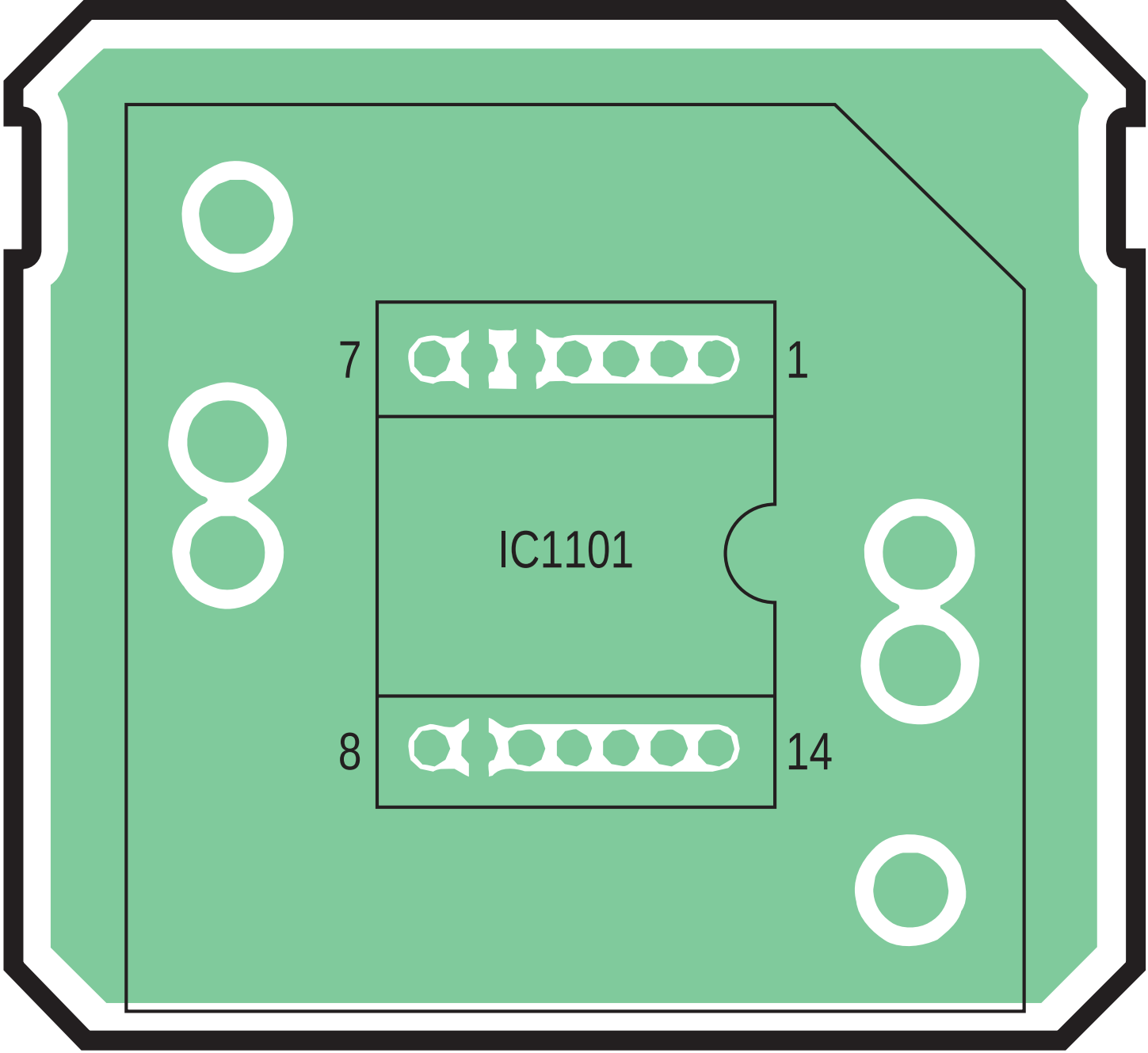
A BBHCM381CE/E



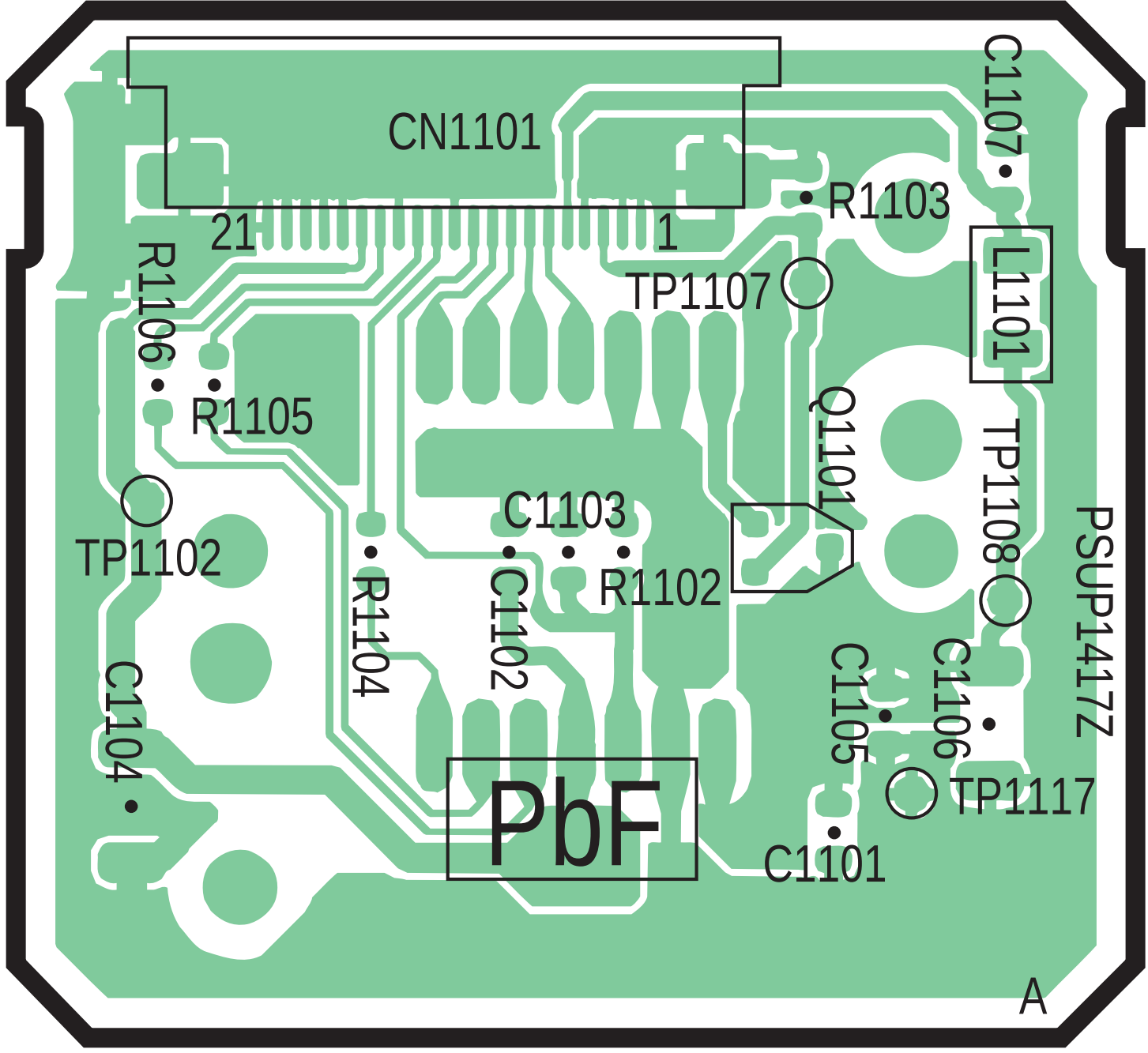
BB-HCM381 I/O BOARD BOTTOM VIEW



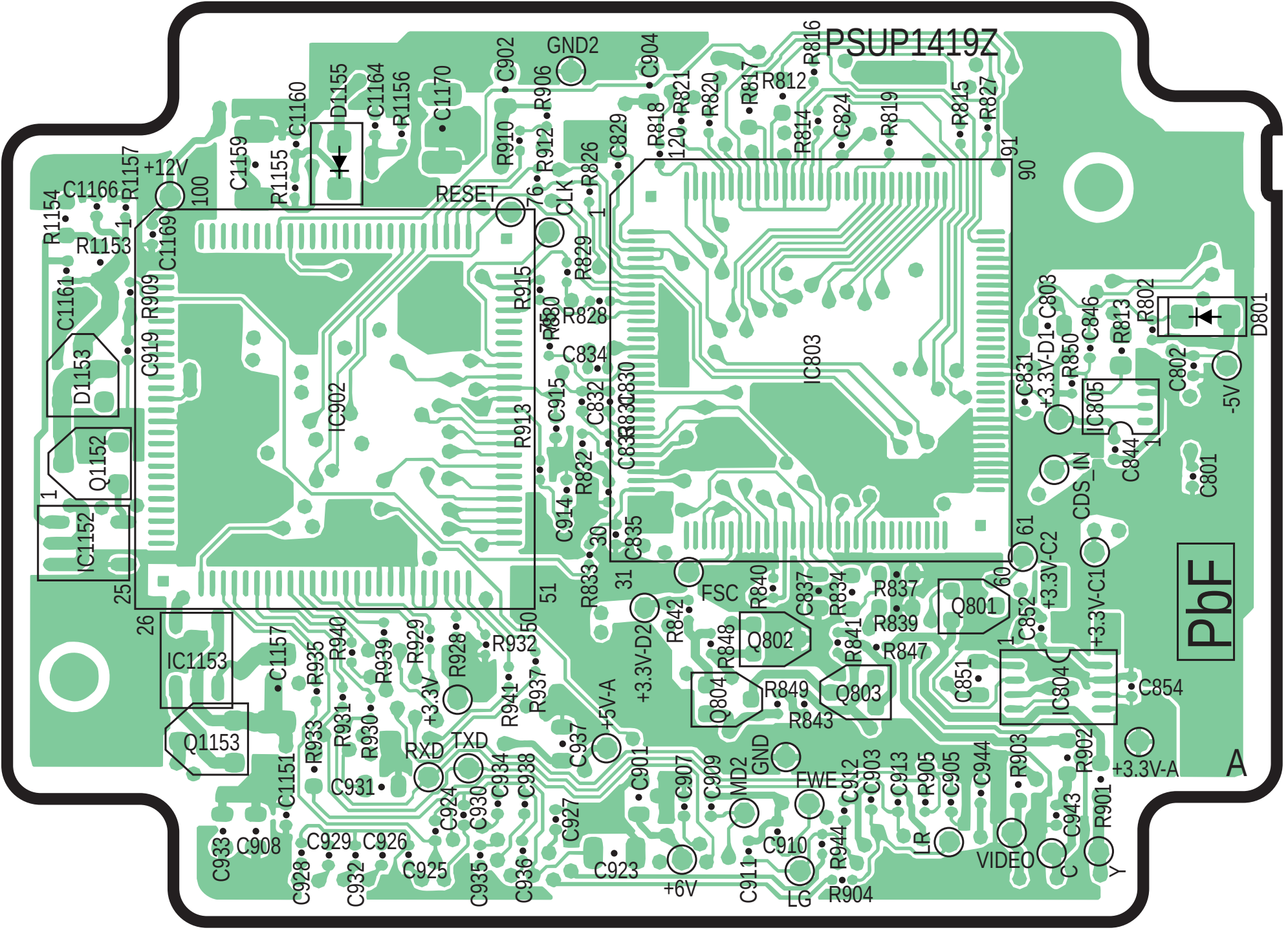
BB-HCM381 I/O BOARD COMPONENT VIEW



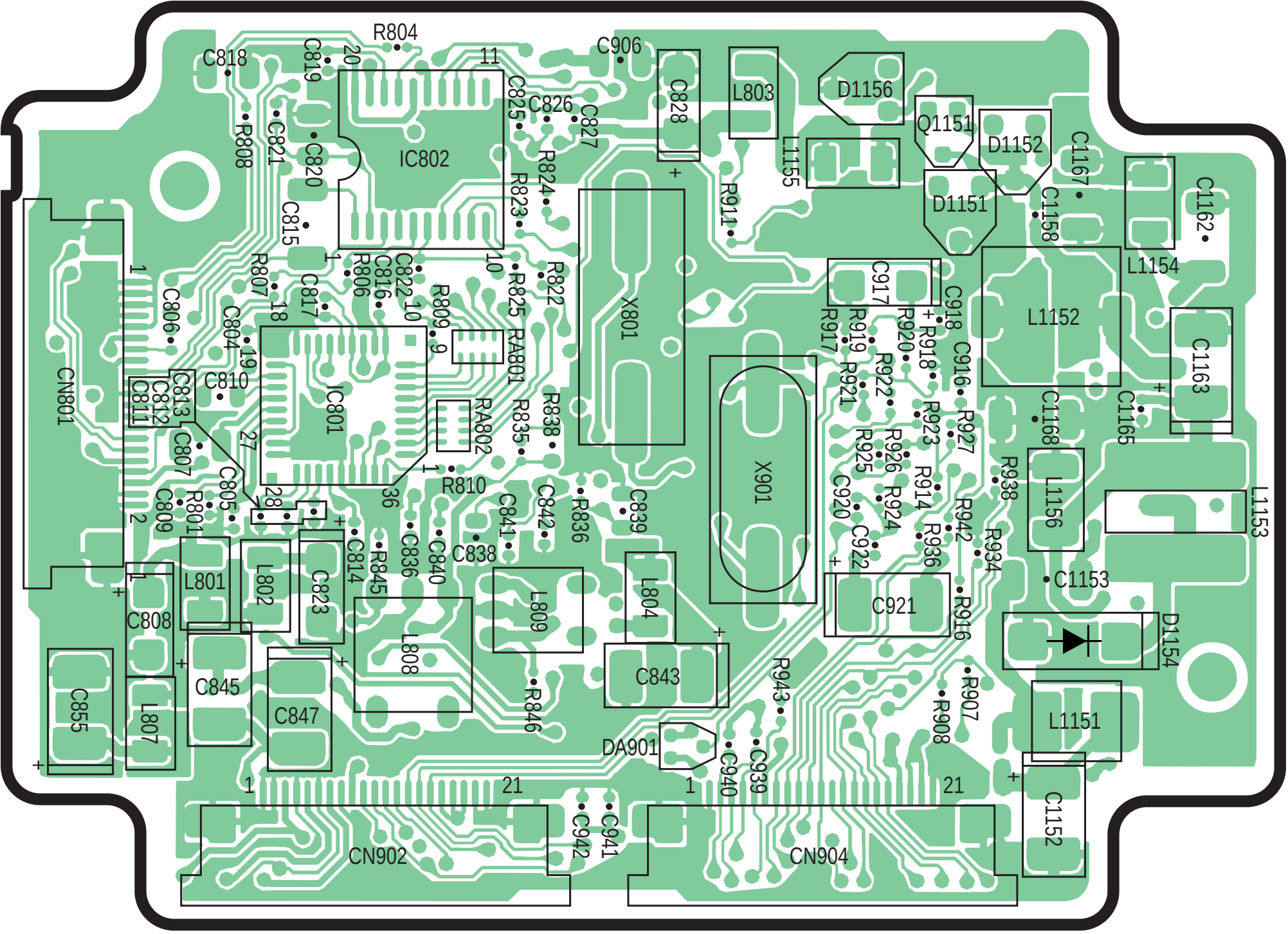
BB-HCM381 CCD BOARD BOTTOM VIEW



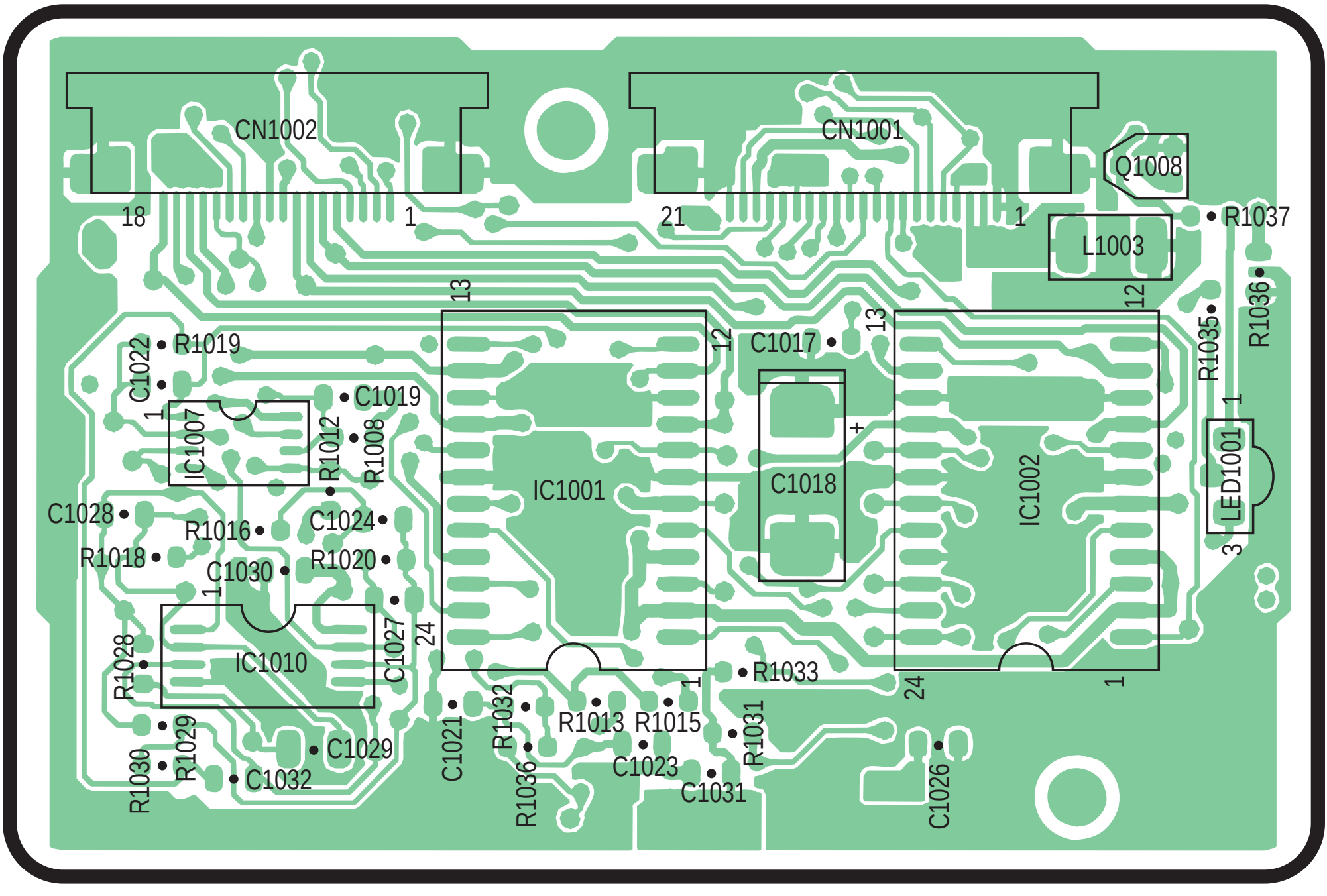
BB-HCM381 CCD BOARD COMPONENT VIEW



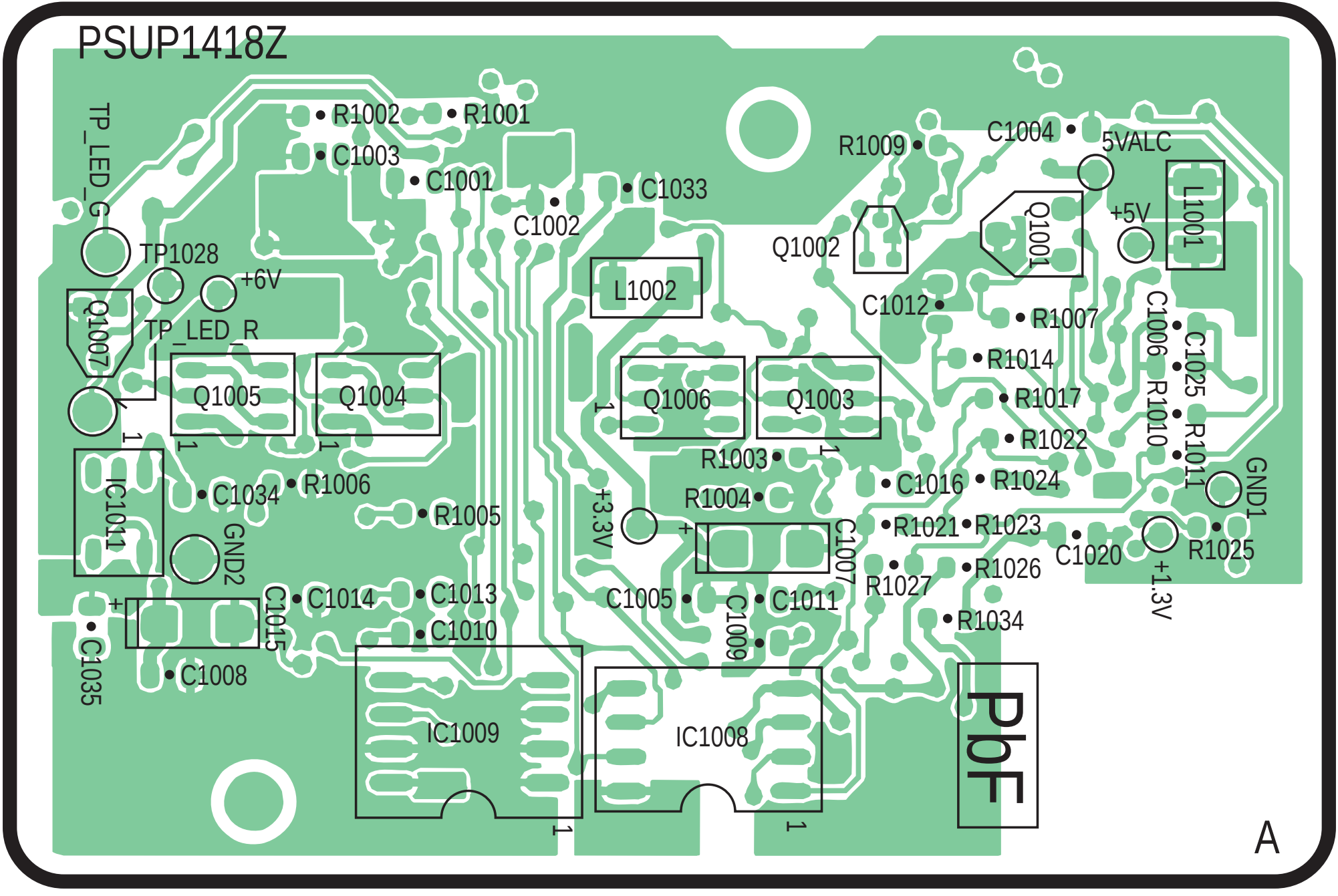
BB-HCM381 VIDEO BOARD BOTTOM VIEW



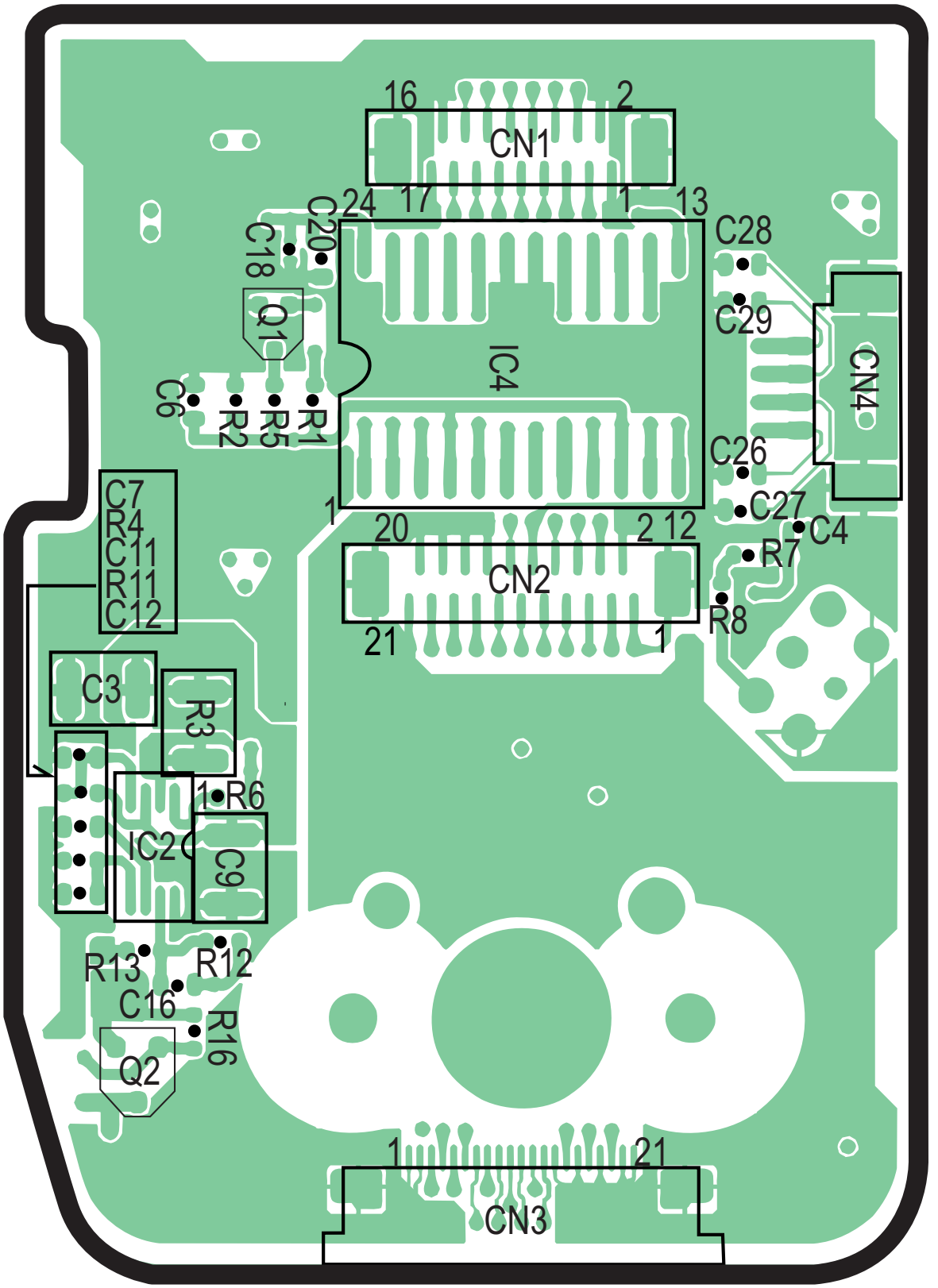
BB-HCM381 VIDEO BOARD COMPONEMT VIEW



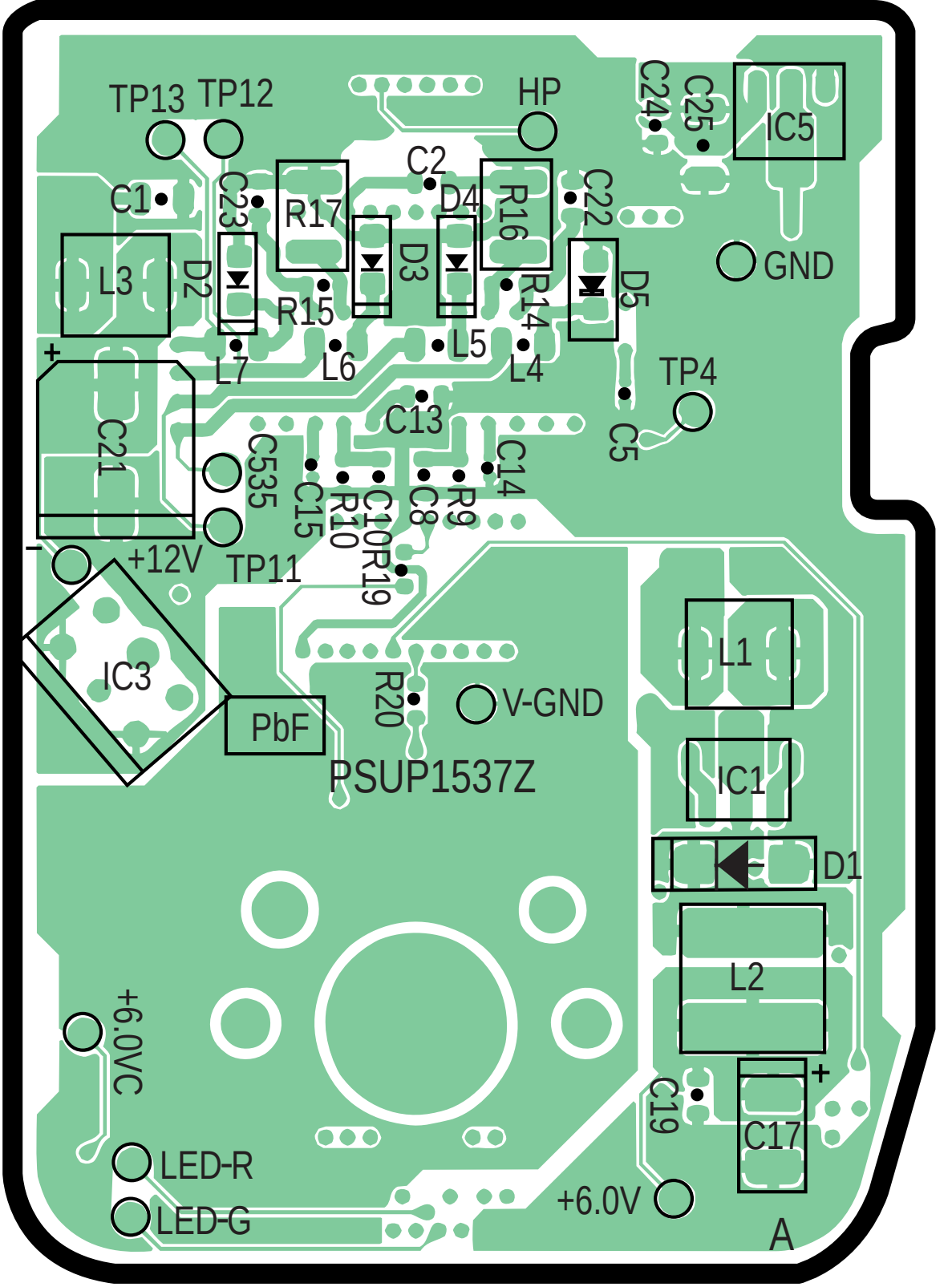
BB-HCM381 LENS BOARD BOTTOM VIEW



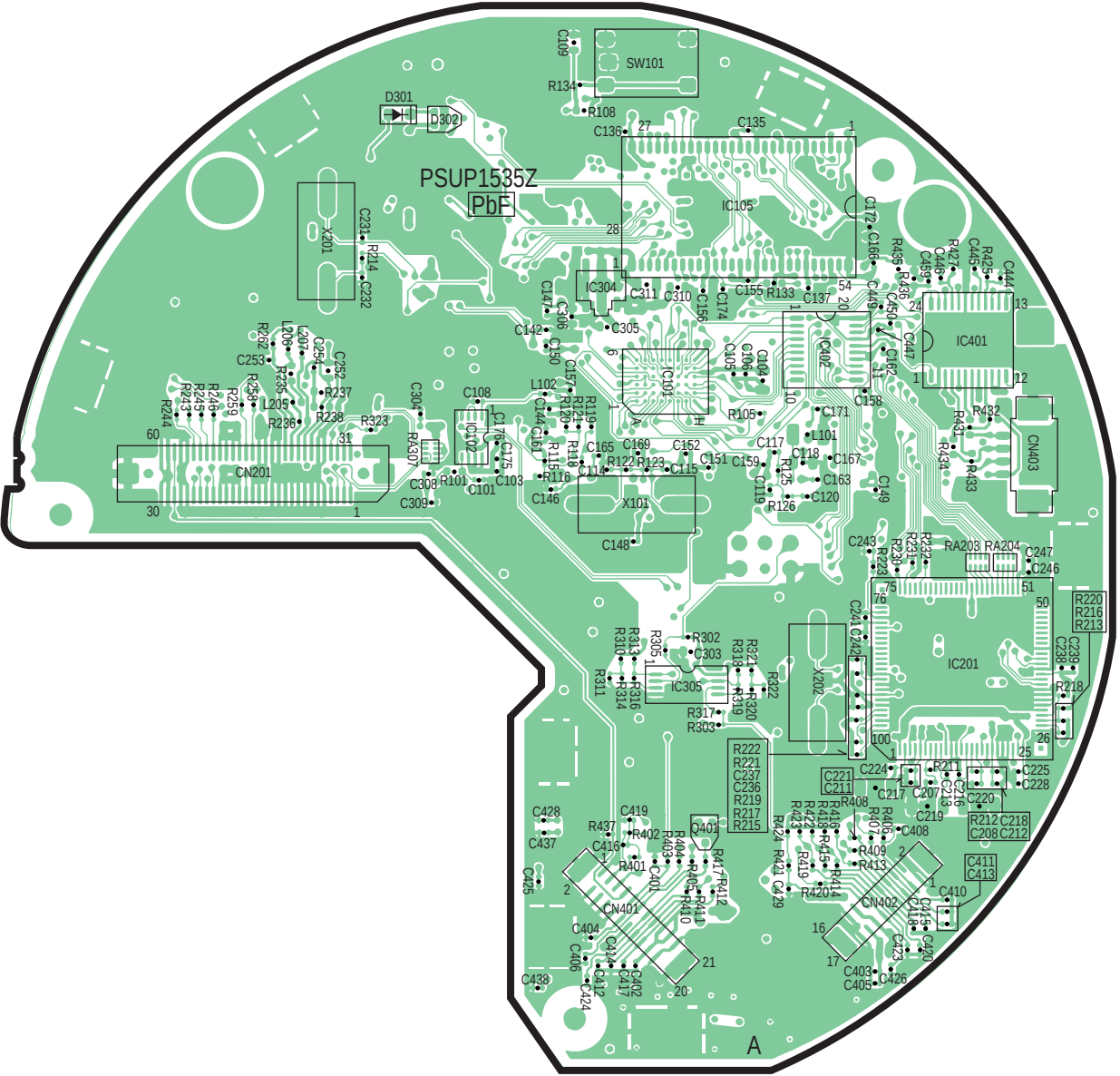
BB-HCM381 LENS BOARD COMPONENT VIEW



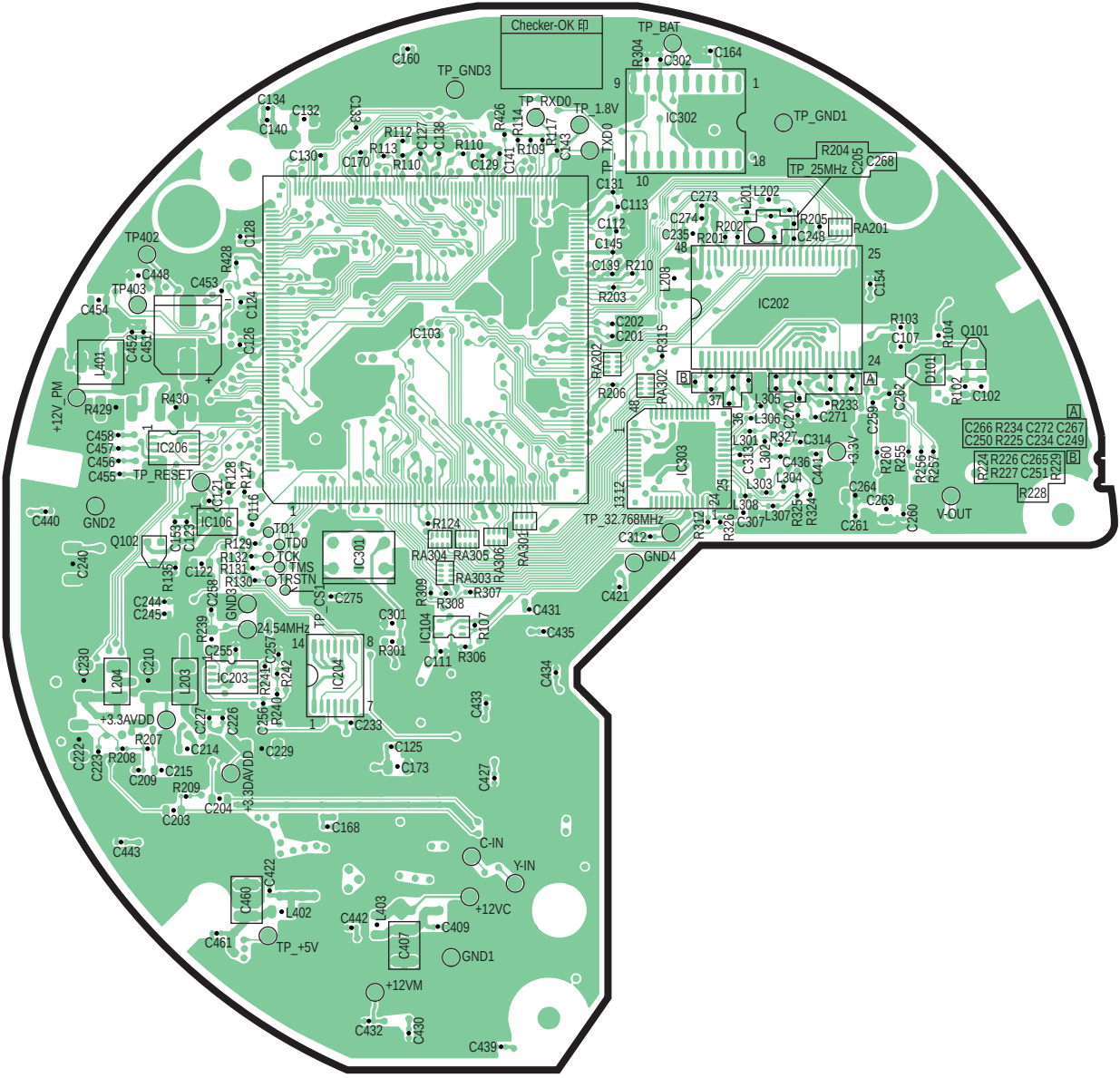
BB-HCM381 TILT BOARD BOTTOM VIEW



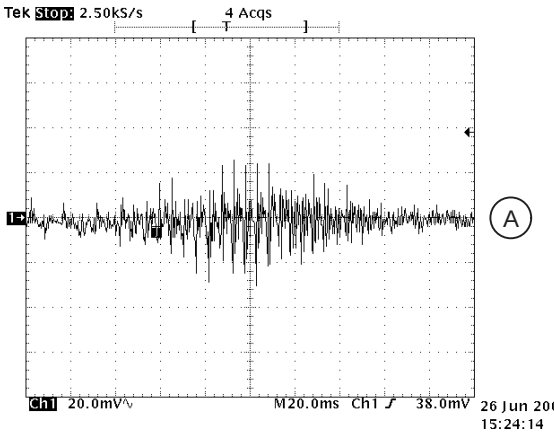
BB-HCM381 TILT BOARD COMPONENT VIEW



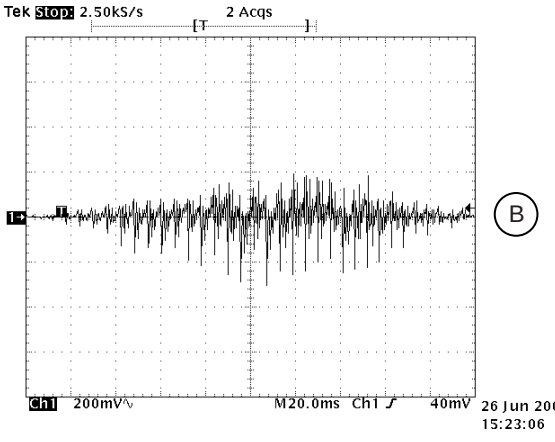
BB-HCM381 MAIN BOARD BOTTOM VIEW



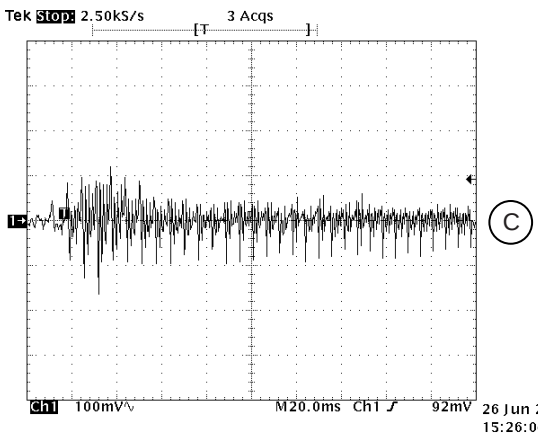
BB-HCM381 MAIN BOARD COMPONENT VIEW


Tek Stop: 2.50kS/s 4 Acqs
Ch1 20.0mV M20.0ms Ch1 38.0mV
26 Jun 2004
15:24:14

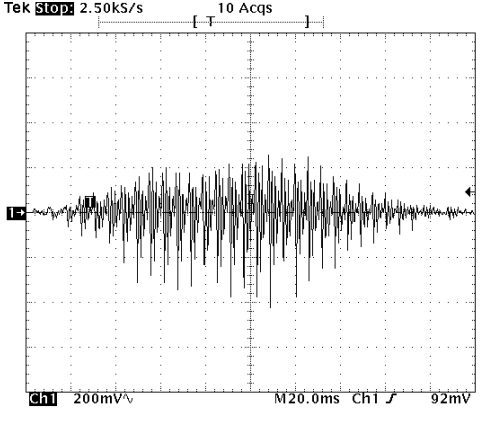
A


Tek Stop: 2.50kS/s 2 Acqs
Ch1 200mV M20.0ms Ch1 40mV
26 Jun 2004
15:23:06

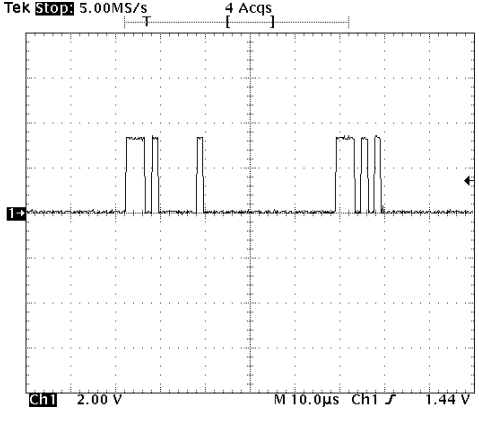
B


Tek Stop: 2.50kS/s 3 Acqs
Ch1 100mV M20.0ms Ch1 92mV
26 Jun 2004
15:26:04

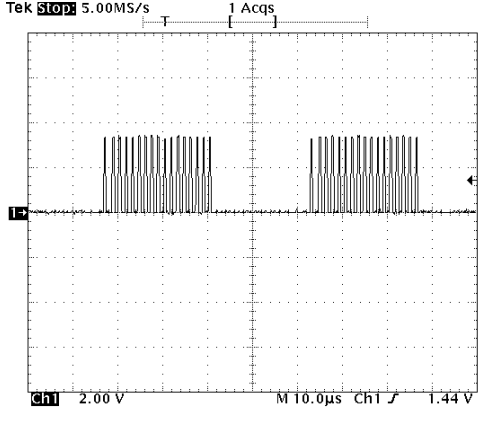
C


Tek Stop: 2.50kS/s 10 Acqs
Ch1 200mV M20.0ms Ch1 92mV

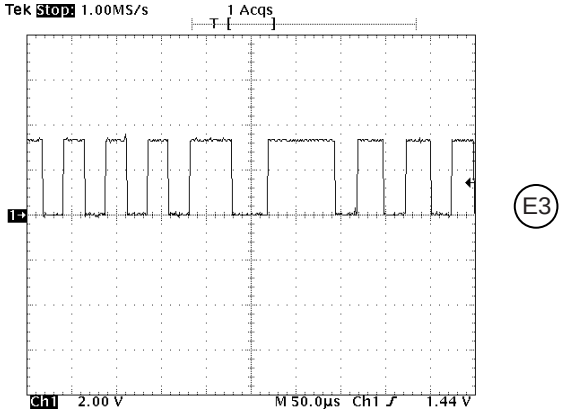
D


Tek Stop: 5.00MS/s 4 Acqs
Ch1 2.00 V M 10.0µs Ch1 1.44 V

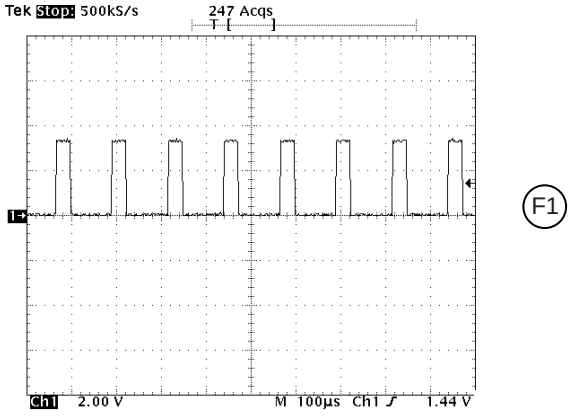
E1


Tek Stop: 5.00MS/s 1 Acqs
Ch1 2.00 V M 10.0µs Ch1 1.44 V

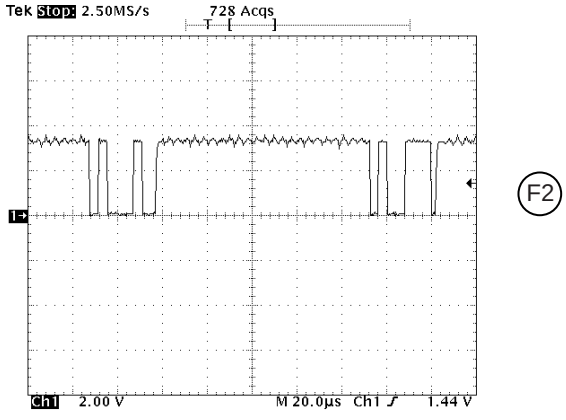
E2



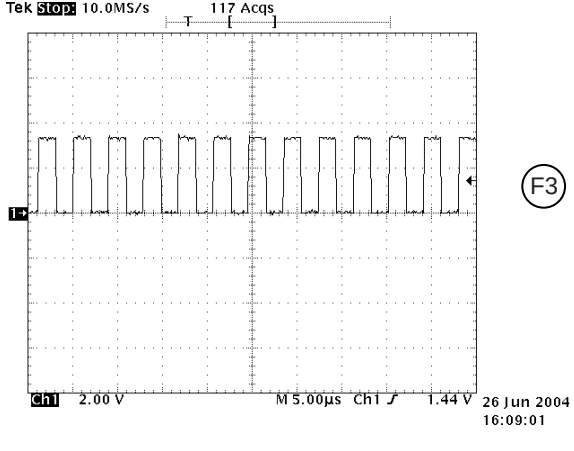
E3



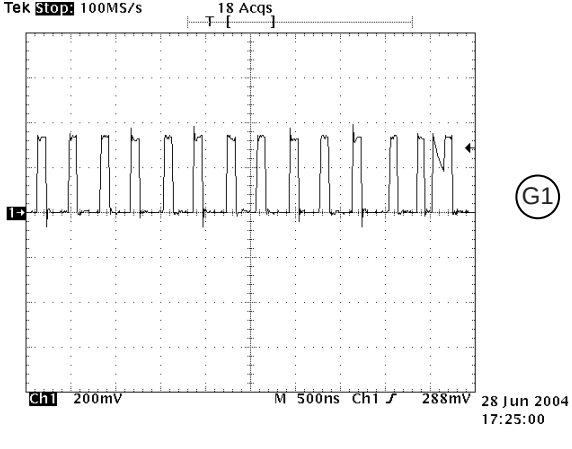
F1



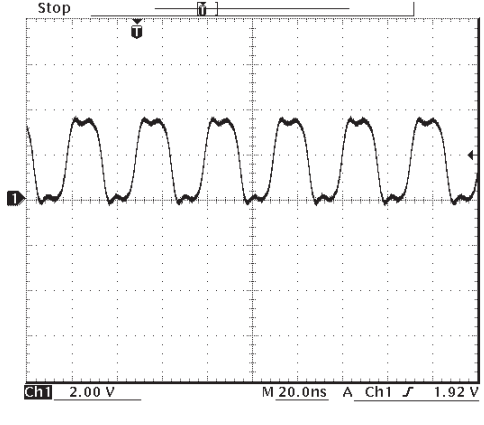
F2



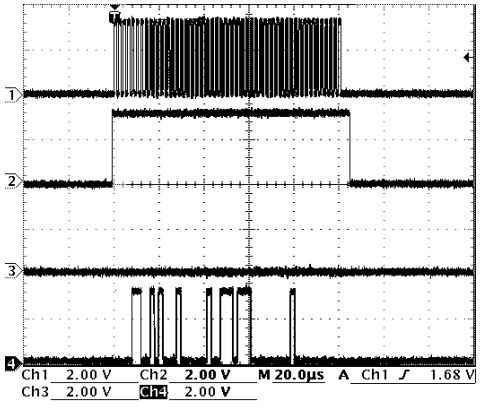
F3

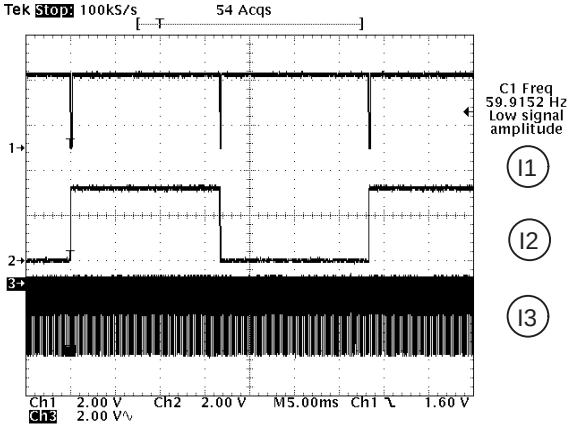


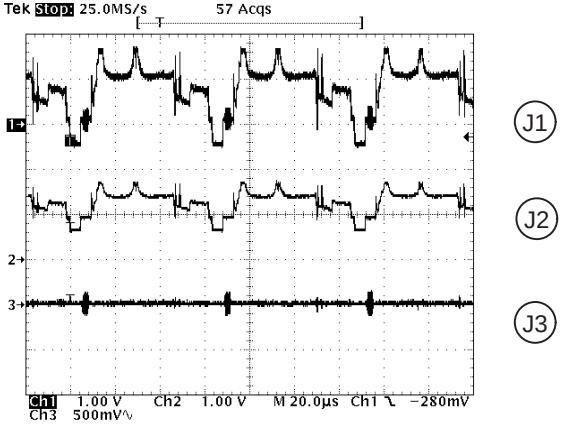
G1

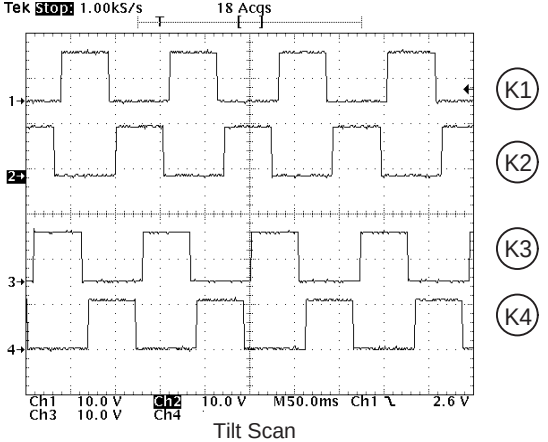


G2

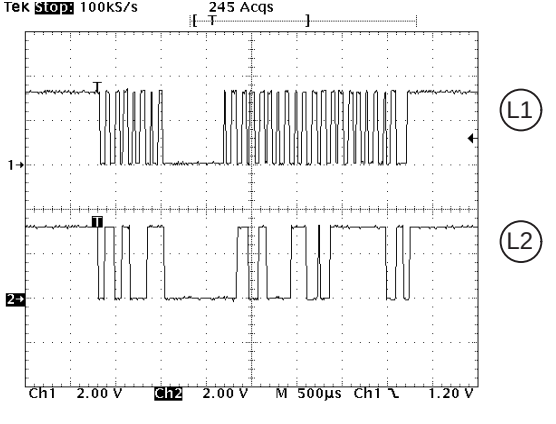

H2
H3
H4
H5
Ch1 2.00 V Ch2 2.00 V M 20.0µs A Ch1 1.68 V
Ch3 2.00 V Ch4 2.00 V

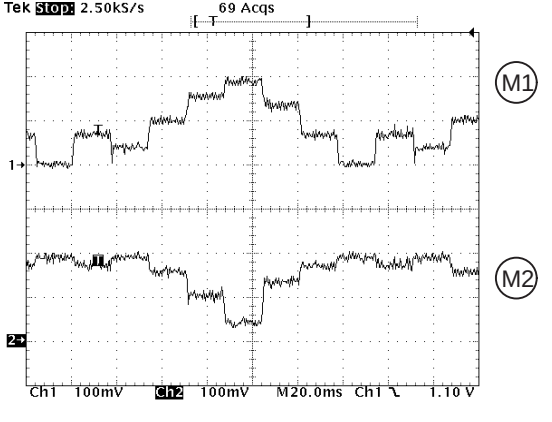

Tek Stop: 100kS/s 54 Acqs
C1 Freq
59.9152 Hz
Low signal
amplitude
I1
I2
I3
Ch1 2.00 V Ch2 2.00 V M5.00ms Ch1 1.60 V
Ch3 2.00 V

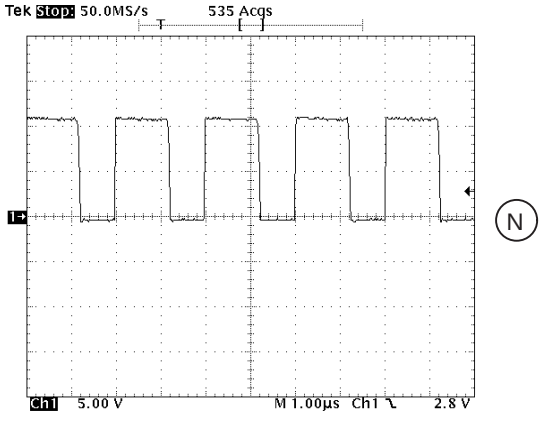

Tek Stop: 25.0MS/s 57 Acqs
J1
J2
J3
Ch1 1.00 V Ch2 1.00 V M 20.0µs Ch1 −280mV
Ch3 500mV


Tek Stop: 1.00kS/s 18 Acqs
K1
K2
K3
K4
Ch1 10.0 V Ch2 10.0 V M50.0ms Ch1 2.6 V
Ch3 10.0 V Ch4

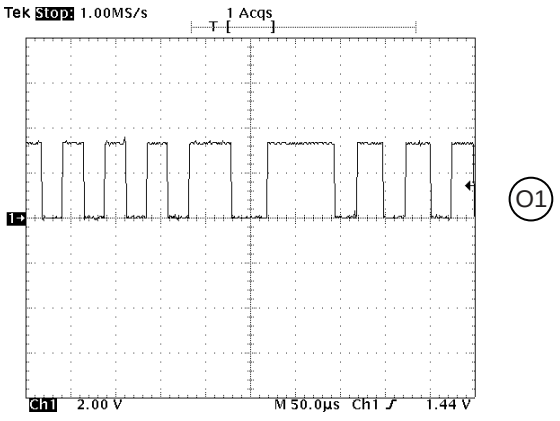
Tilt Scan


Tek Stop: 100kS/s 245 Acqs
L1
L2
Ch1 2.00 V Ch2 2.00 V M 500µs Ch1 1.20 V

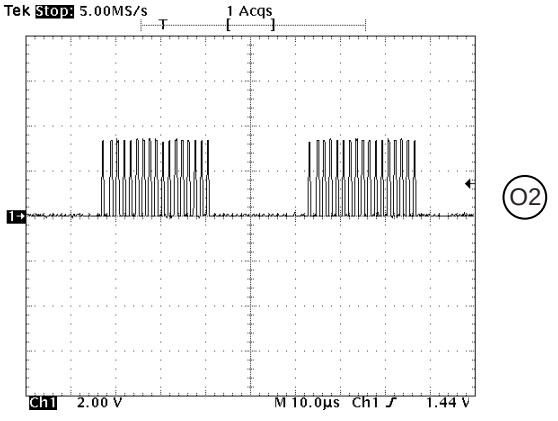

Tek Stop: 2.50kS/s 69 Acqs
M1
M2
Ch1 100mV Ch2 100mV M20.0ms Ch1 1.10 V



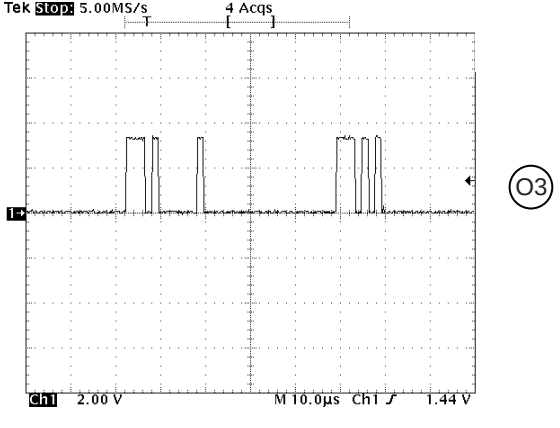
N



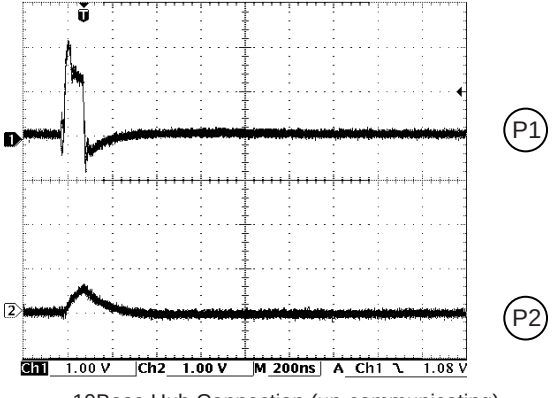
O1



O2



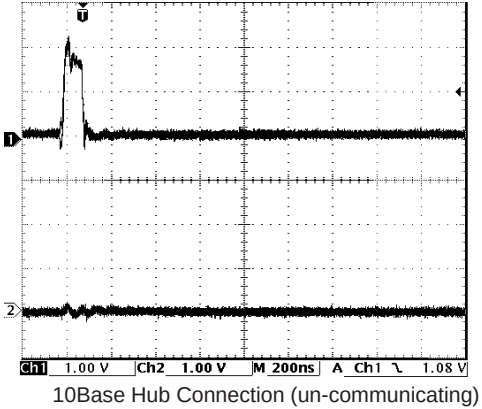
O3



P1

P2

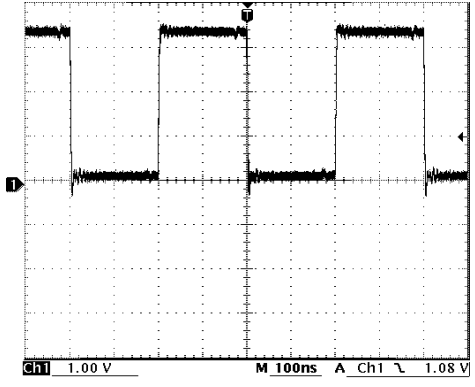
10Base Hub Connection (un-communicating)



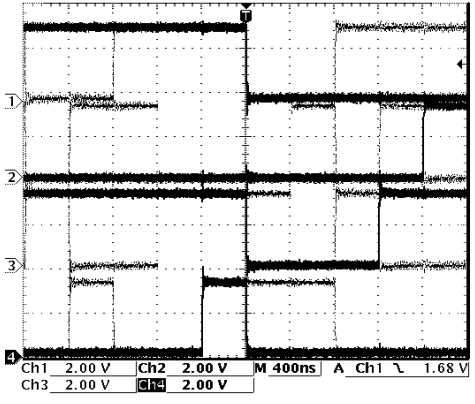
P3

P4

10Base Hub Connection (un-communicating)



P5

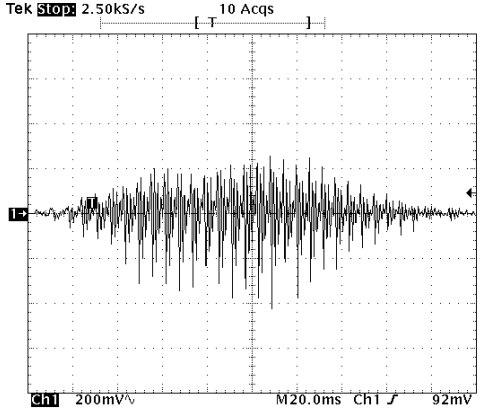


P6

P7

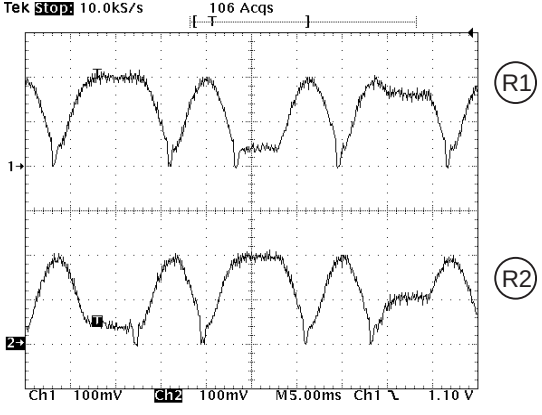
P8

P9



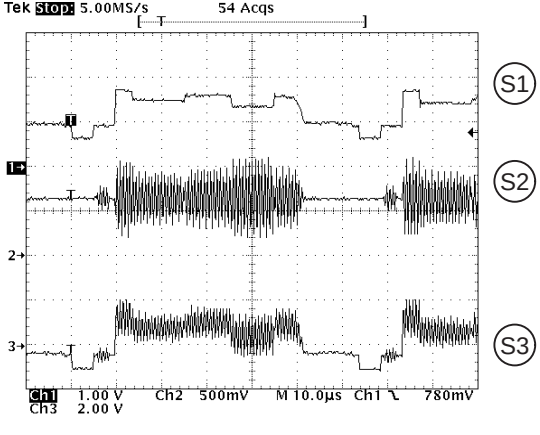
Q

10Base Hub Connection (Communicating)



R1

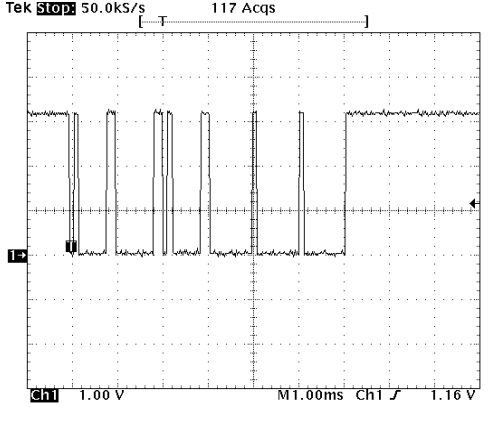
R2



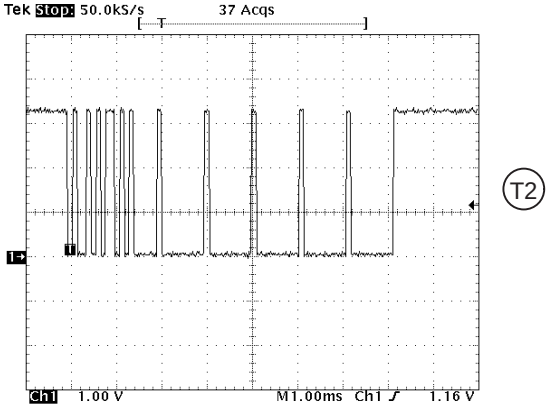
S1

S2

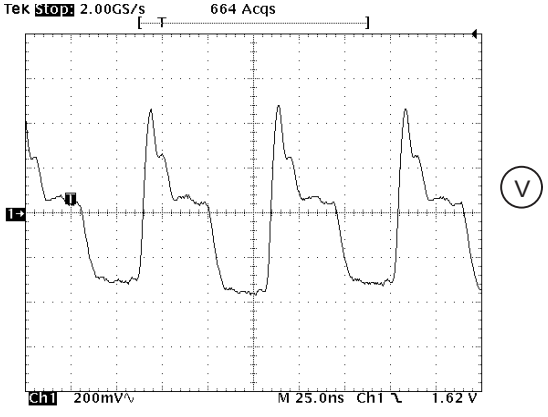
S3



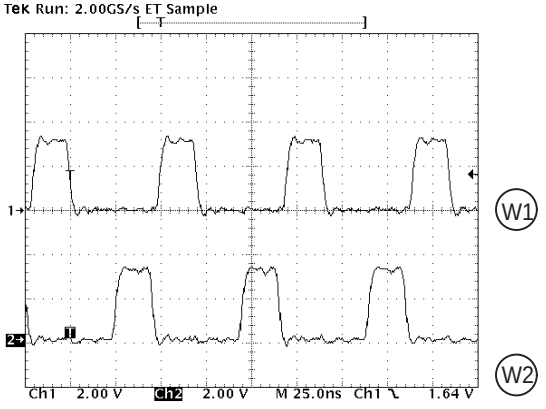
T1



T2

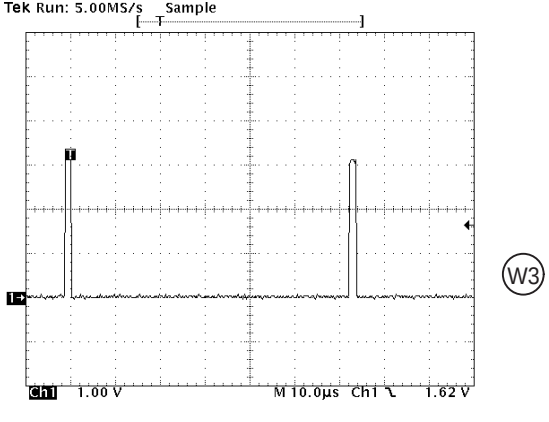


V

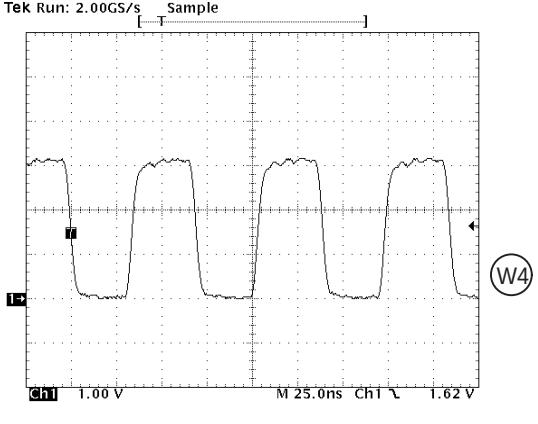


W1

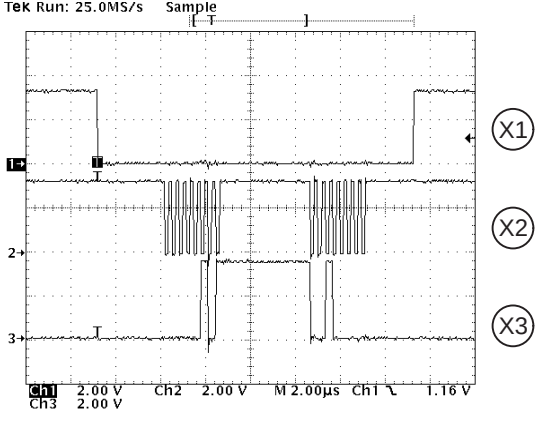
W2



W3



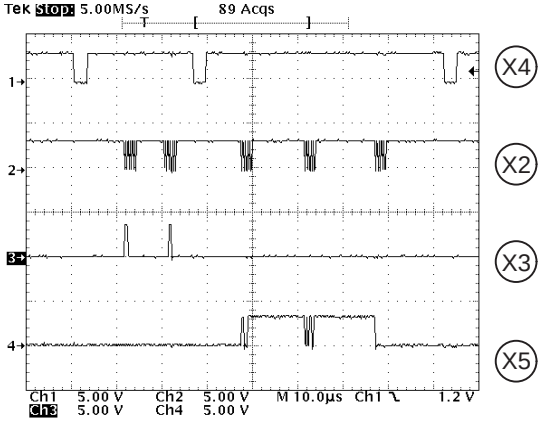
W4

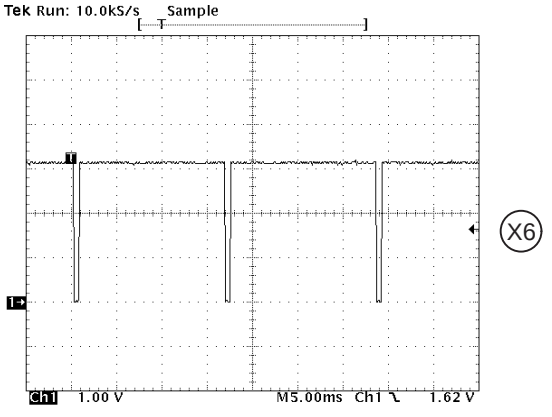


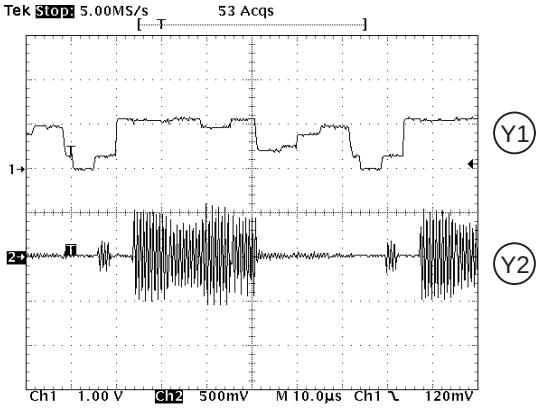
X1

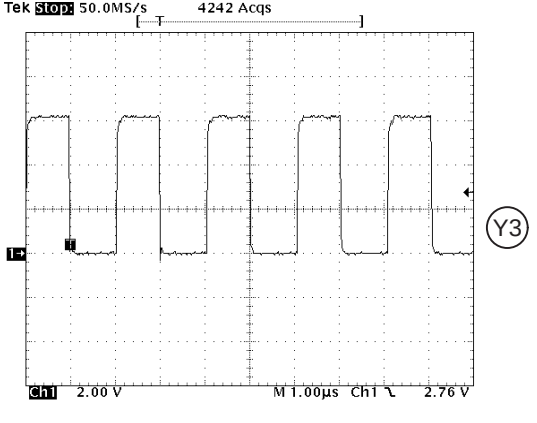
X2

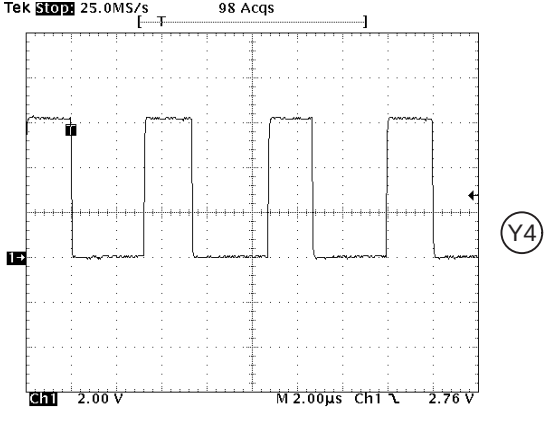
X3

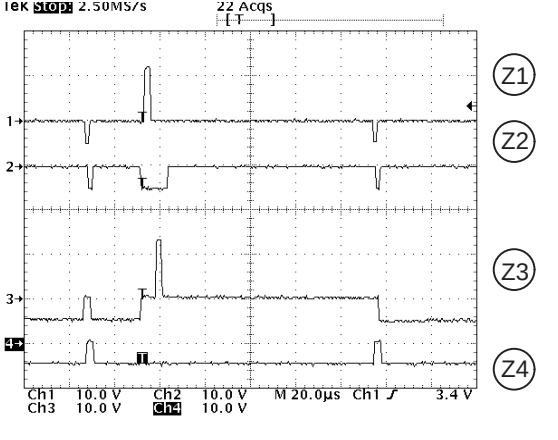

Tek Stop: 5.00MS/s 89 Acqs
X4
X2
X3
X5
Ch1 5.00 V Ch2 5.00 V M 10.0µs Ch1 1.2 V
Ch3 5.00 V Ch4 5.00 V

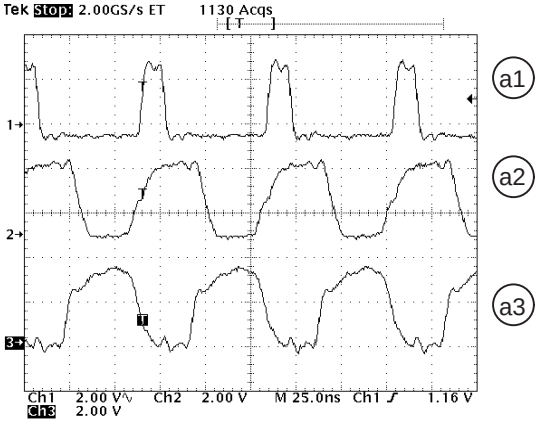

Tek Run: 10.0kS/s Sample
X6
Ch1 1.00 V M5.00ms Ch1 1.62 V


Tek Stop: 5.00MS/s 53 Acqs
Y1
Y2
Ch1 1.00 V Ch2 500mV M 10.0µs Ch1 120mV


Tek Stop: 50.0MS/s 4242 Acqs
Y3
Ch1 2.00 V M 1.00µs Ch1 2.76 V


Tek Stop: 25.0MS/s 98 Acqs
Y4
Ch1 2.00 V M 2.00µs Ch1 2.76 V

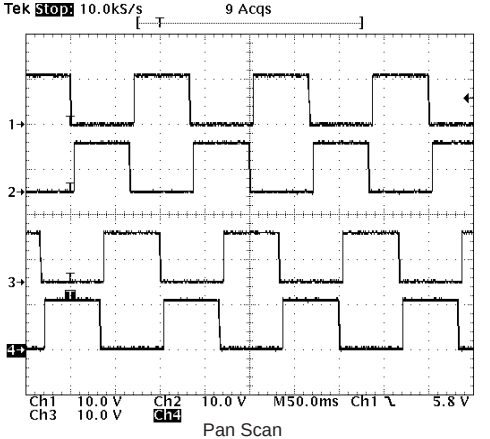

Tek Stop: 2.50MS/s 22 Acqs
Z1
Z2
Z3
Z4
Ch1 10.0 V Ch2 10.0 V M 20.0µs Ch1 3.4 V
Ch3 10.0 V Ch4 10.0 V



a1

a2

a3



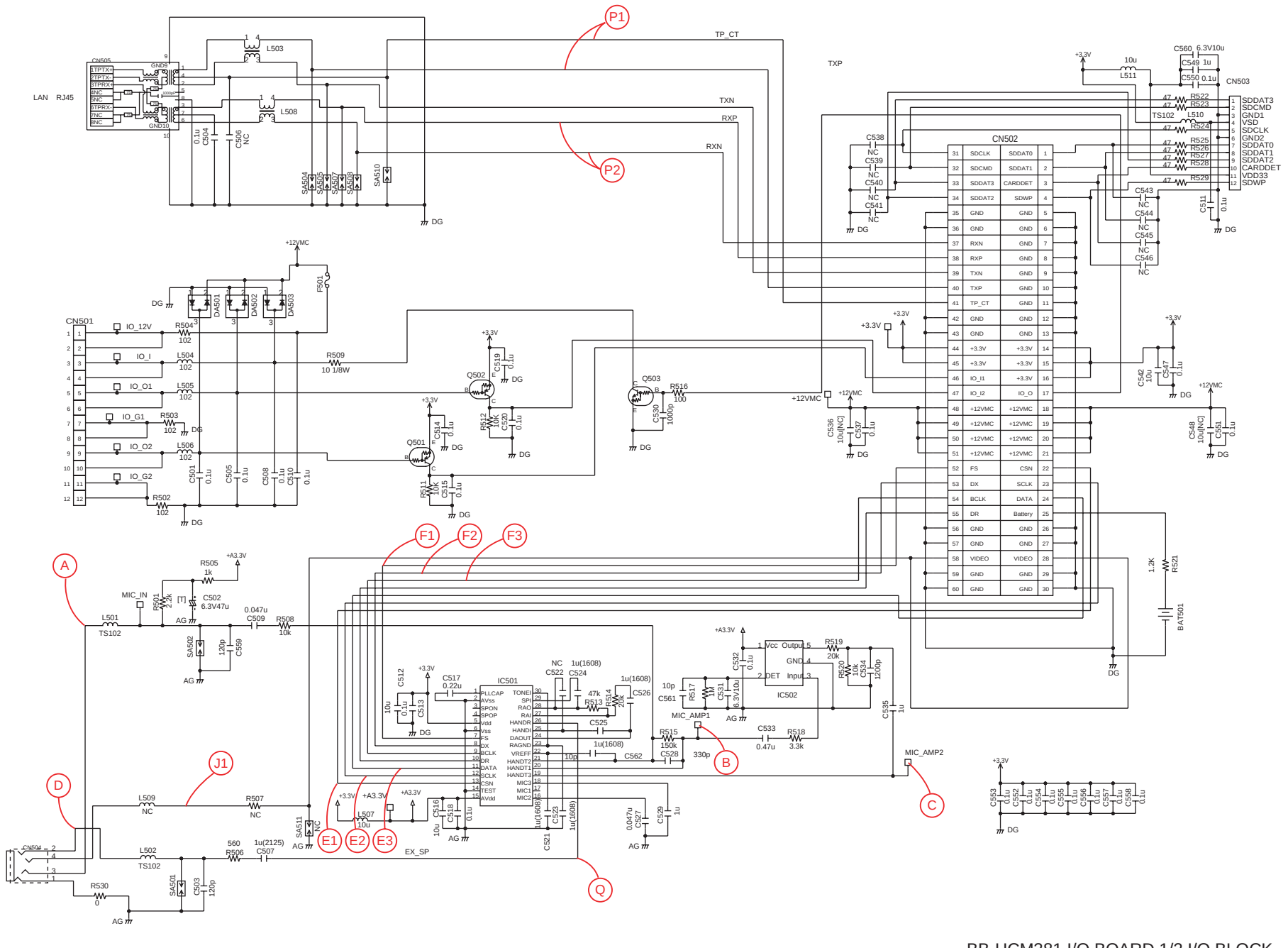
b1

b2

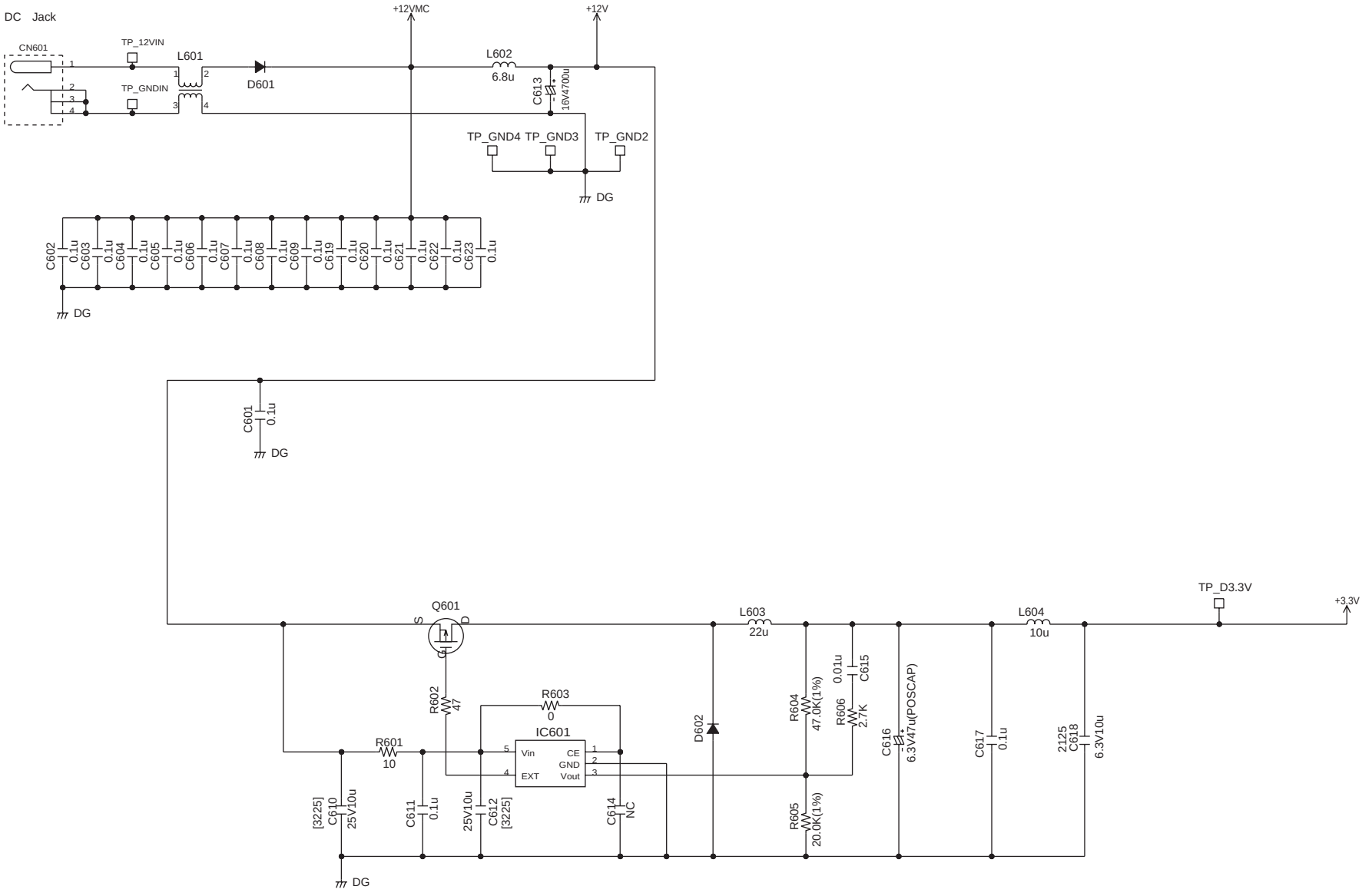
b3

b4

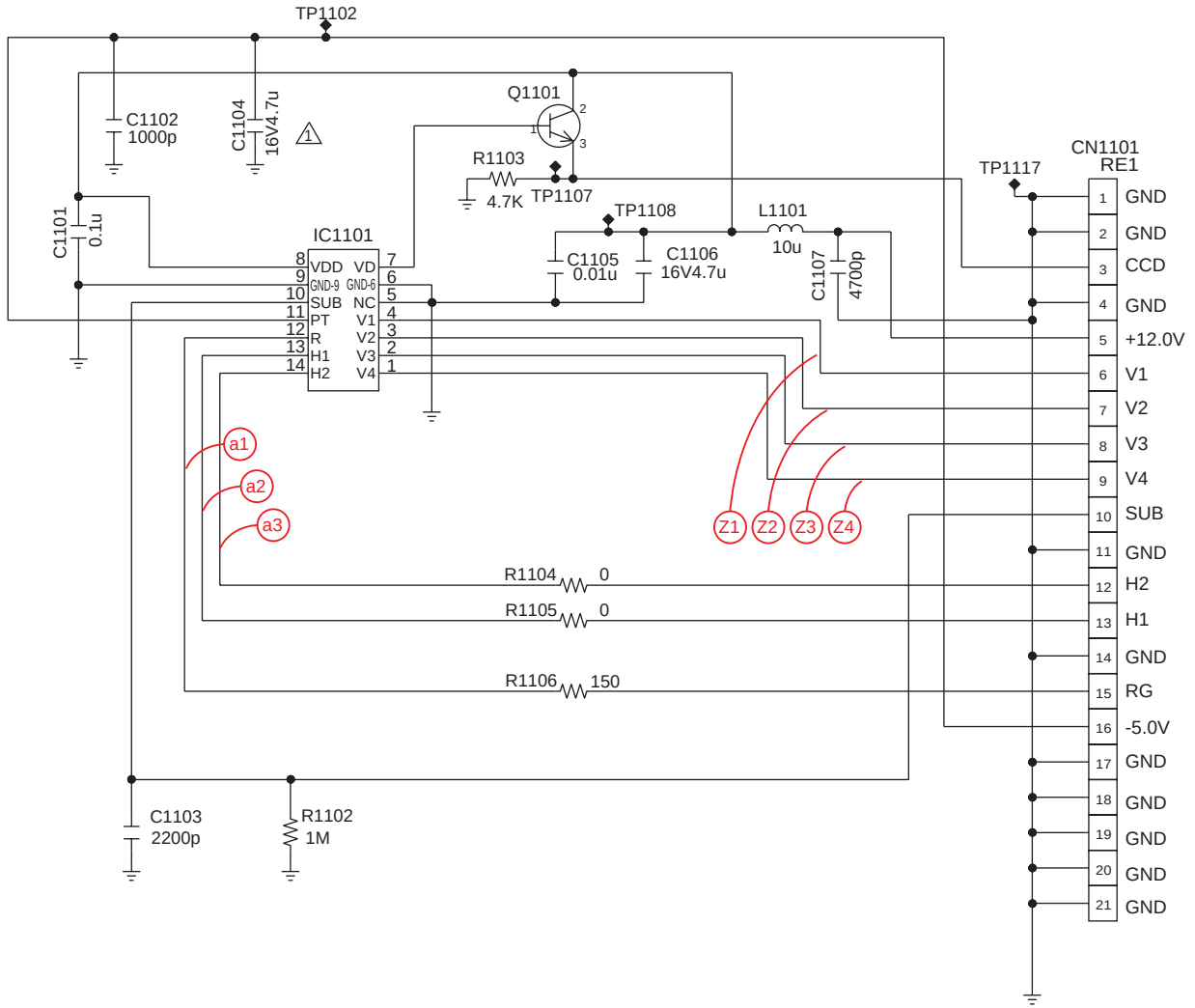
Pan Scan

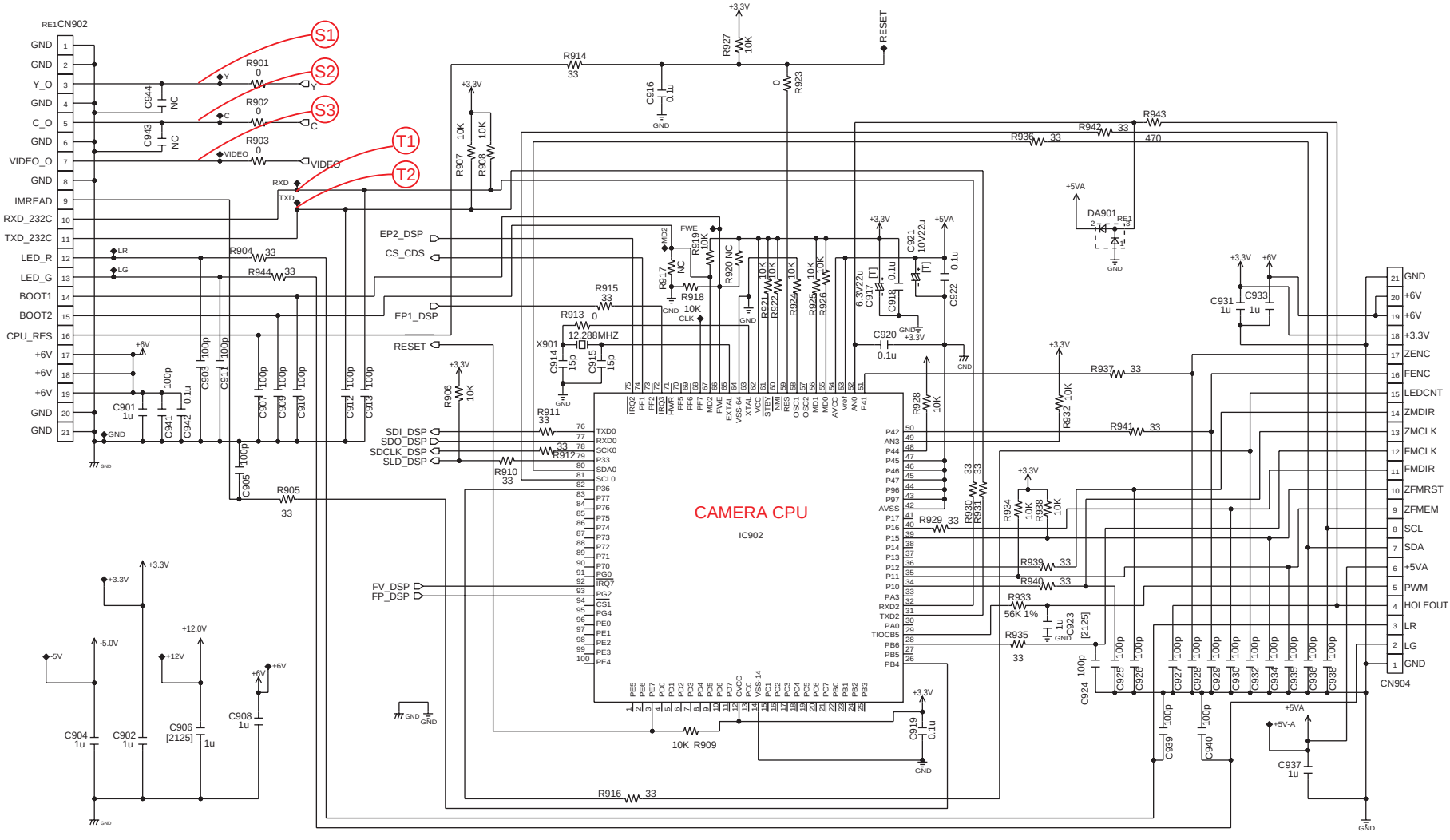


BB-HCM381 I/O BOARD 1/2 I/O BLOCK

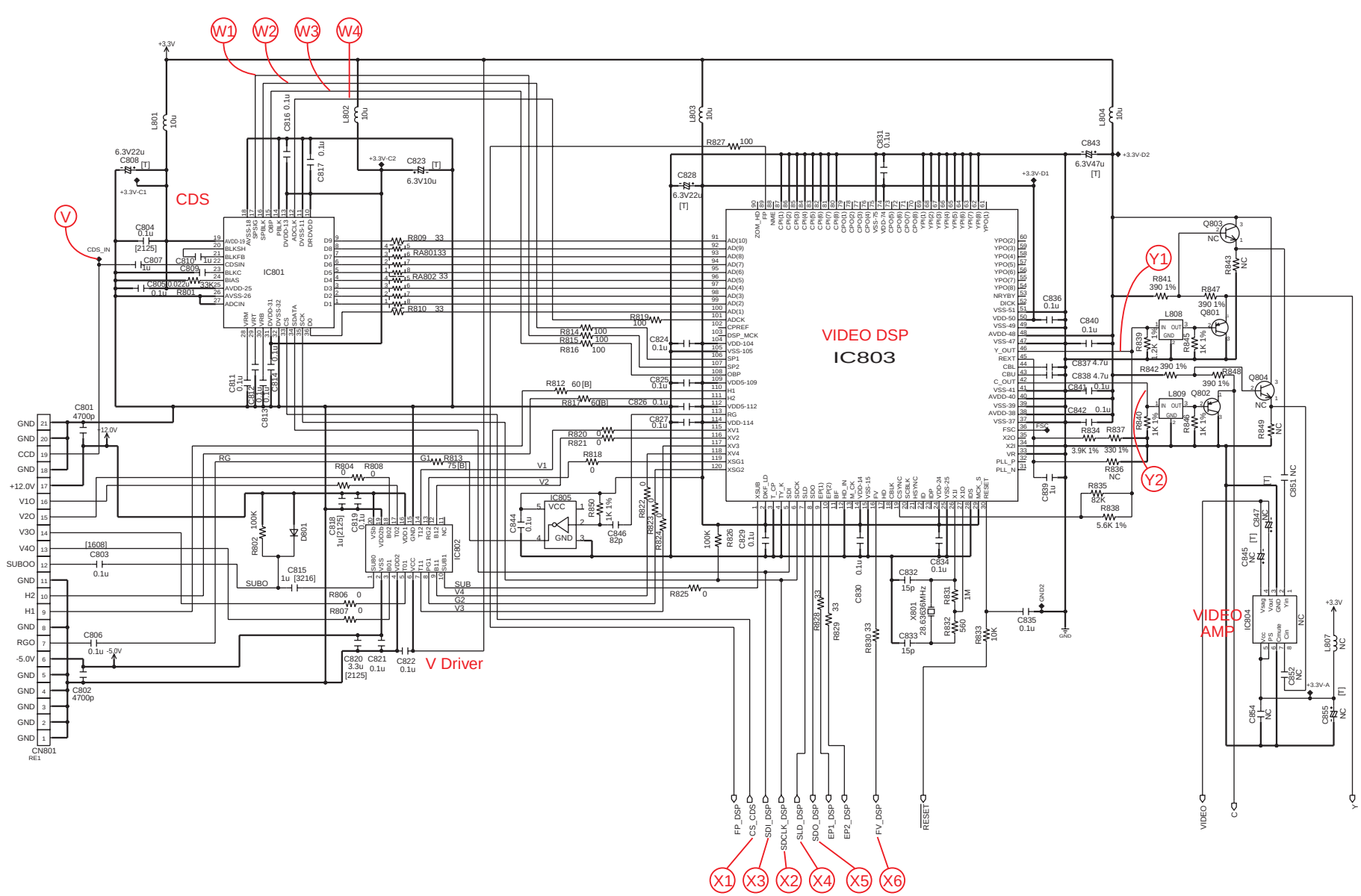


BB-HCM381A I/O BOARD 2/2 POWER SUPPLY BLOCK

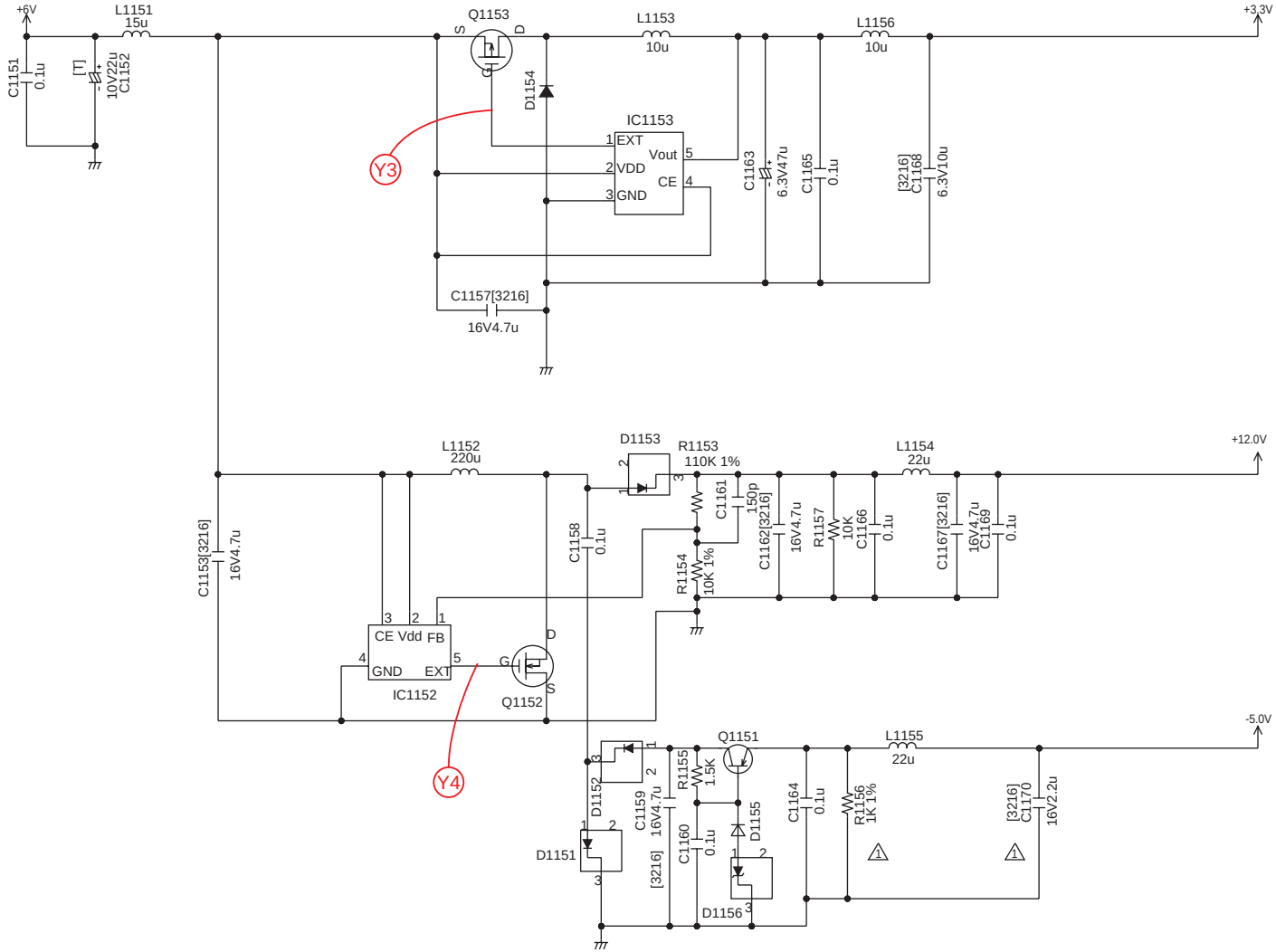

TP1102
C1102
1000p
C1104
16V4.7u
Q1101
R1103
4.7K
TP1107
TP1108
L1101
10u
C1101
0.1u
IC1101
C1105
0.01u
C1106
16V4.7u
C1107
4700p
TP1117
CN1101
RE1
GND
GND
CCD
GND
+12.0V
V1
V2
V3
V4
SUB
GND
H2
H1
GND
RG
-5.0V
GND
GND
GND
GND
GND
a1
a2
a3
Z1
Z2
Z3
Z4
R1104
0
R1105
0
R1106
150
C1103
2200p
R1102
1M



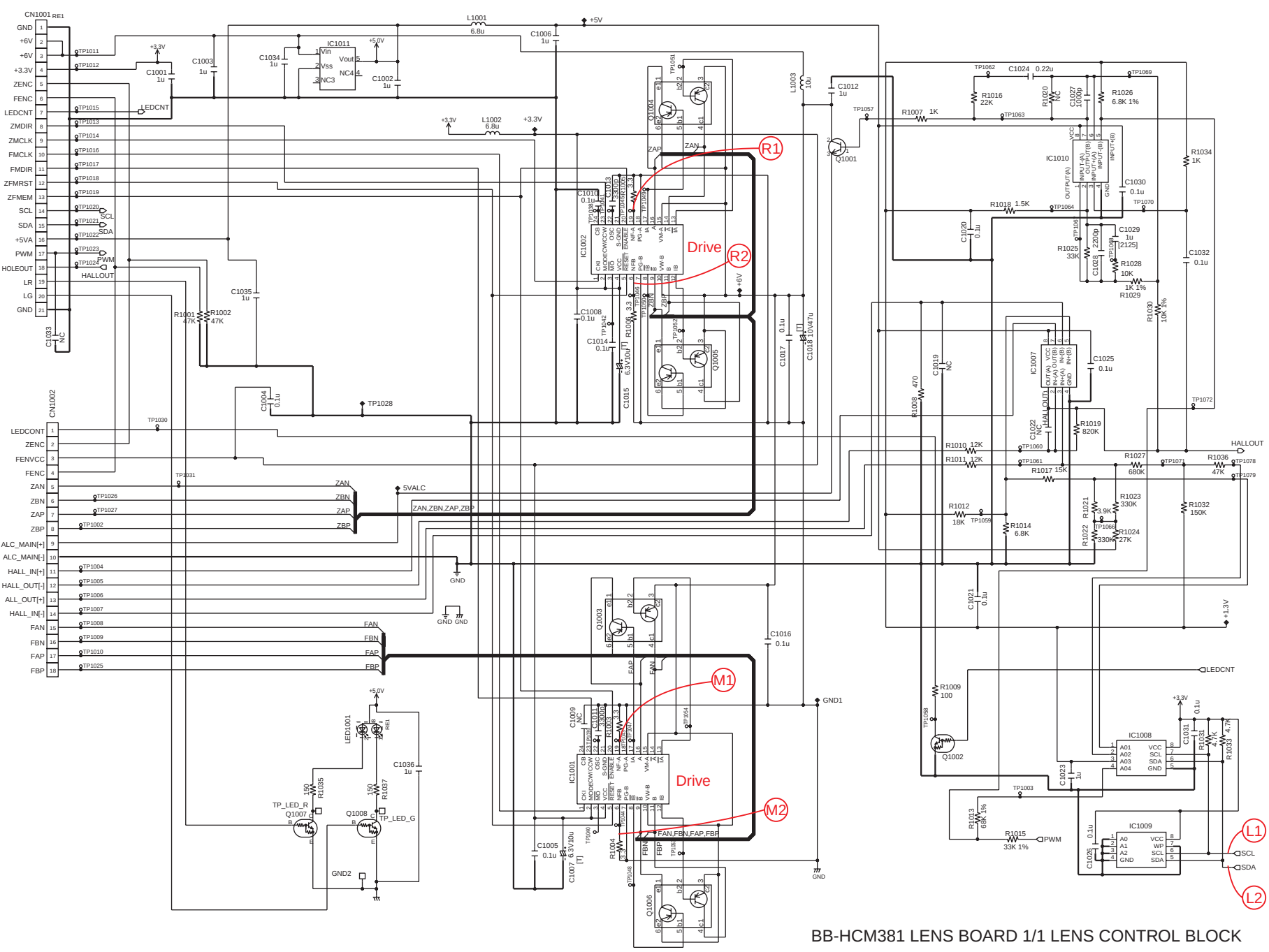
BB-HCM381 VIDEO BOARD 1/3 CPU CIRCUIT BLOCK



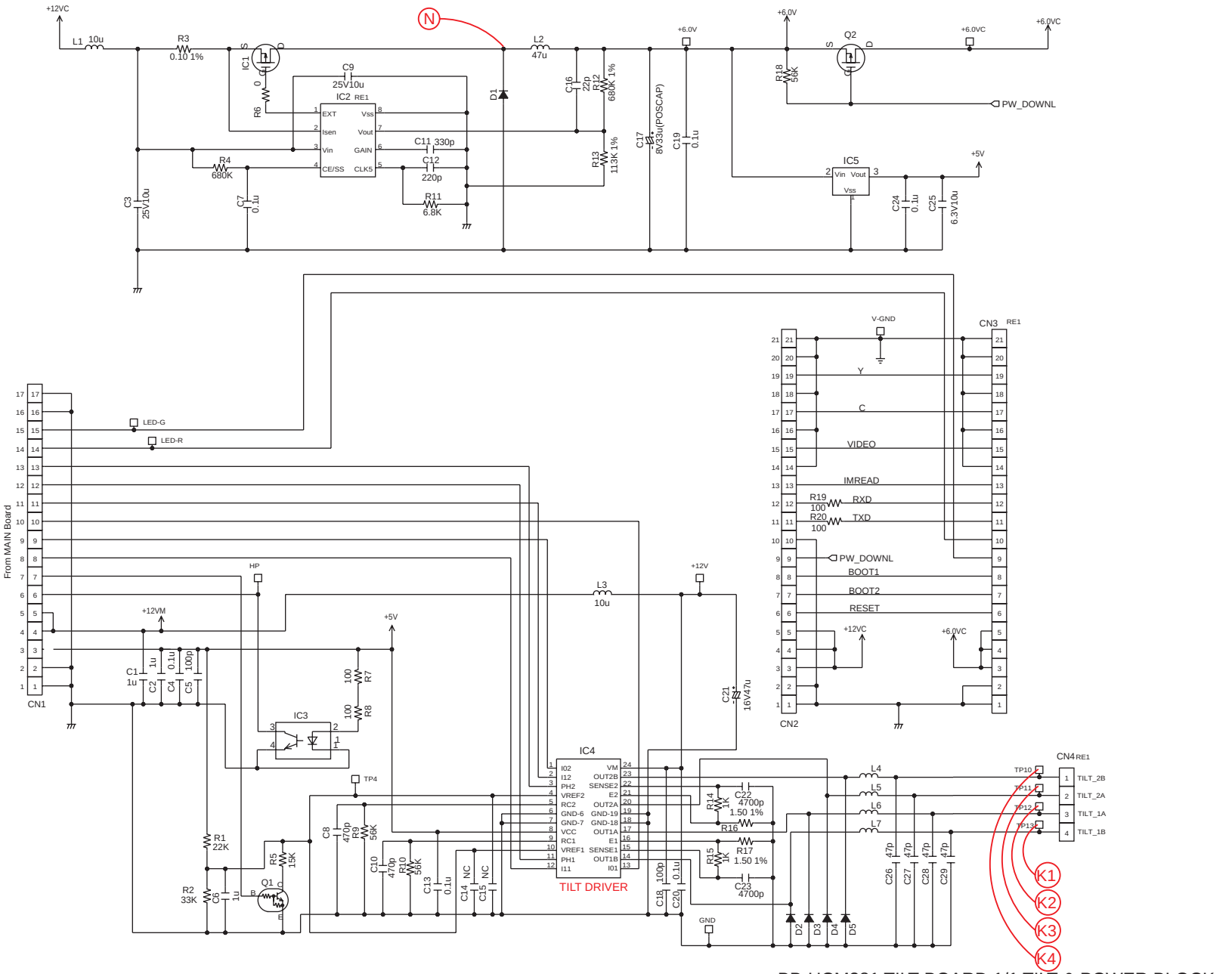
BB-HCM381 VIDEO BOARD 2/3 VIDEO BLOCK



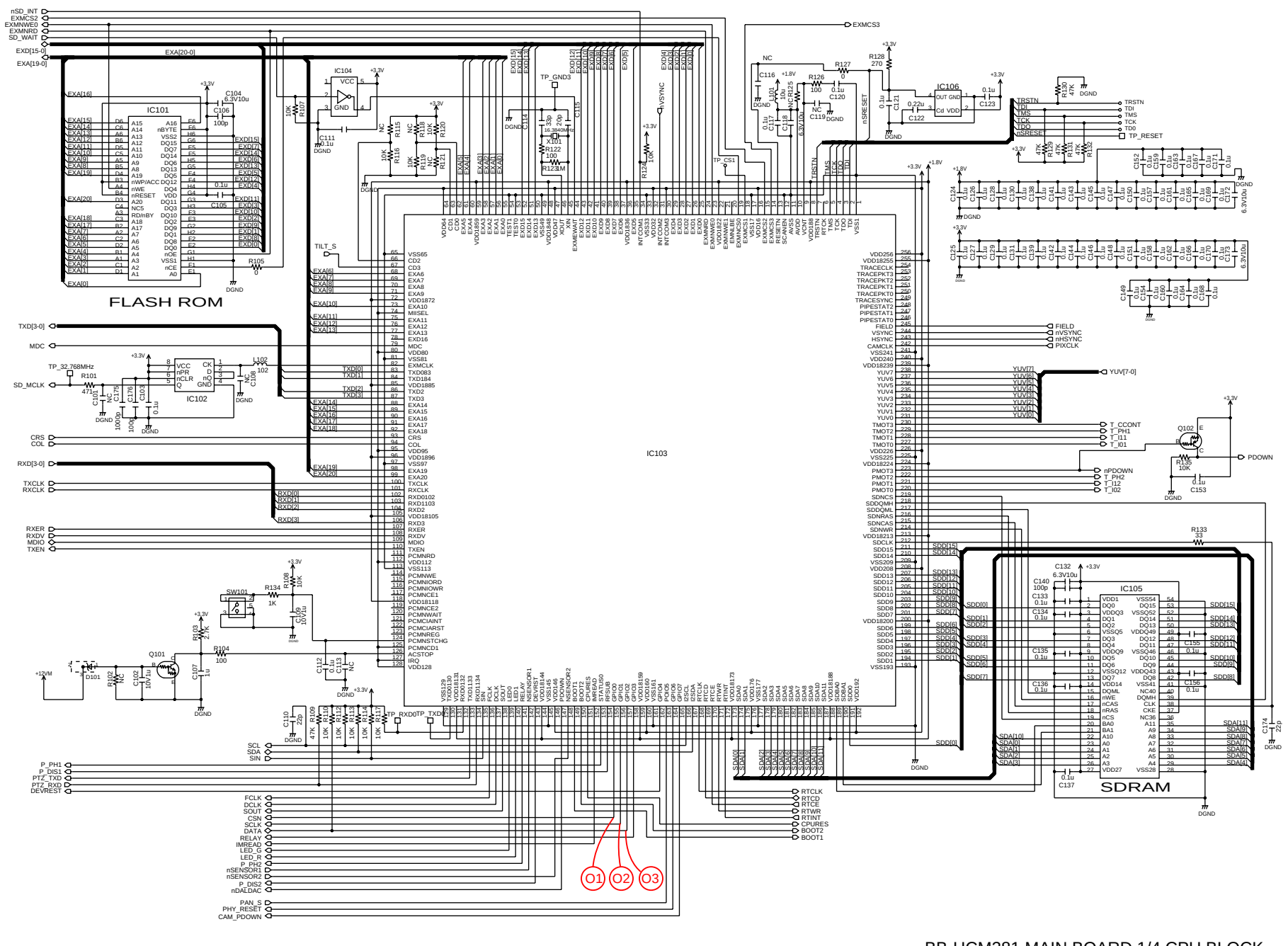
BB-HCM381 VIDEO BOARD 3/3 POWER SUPPLY BLOCK

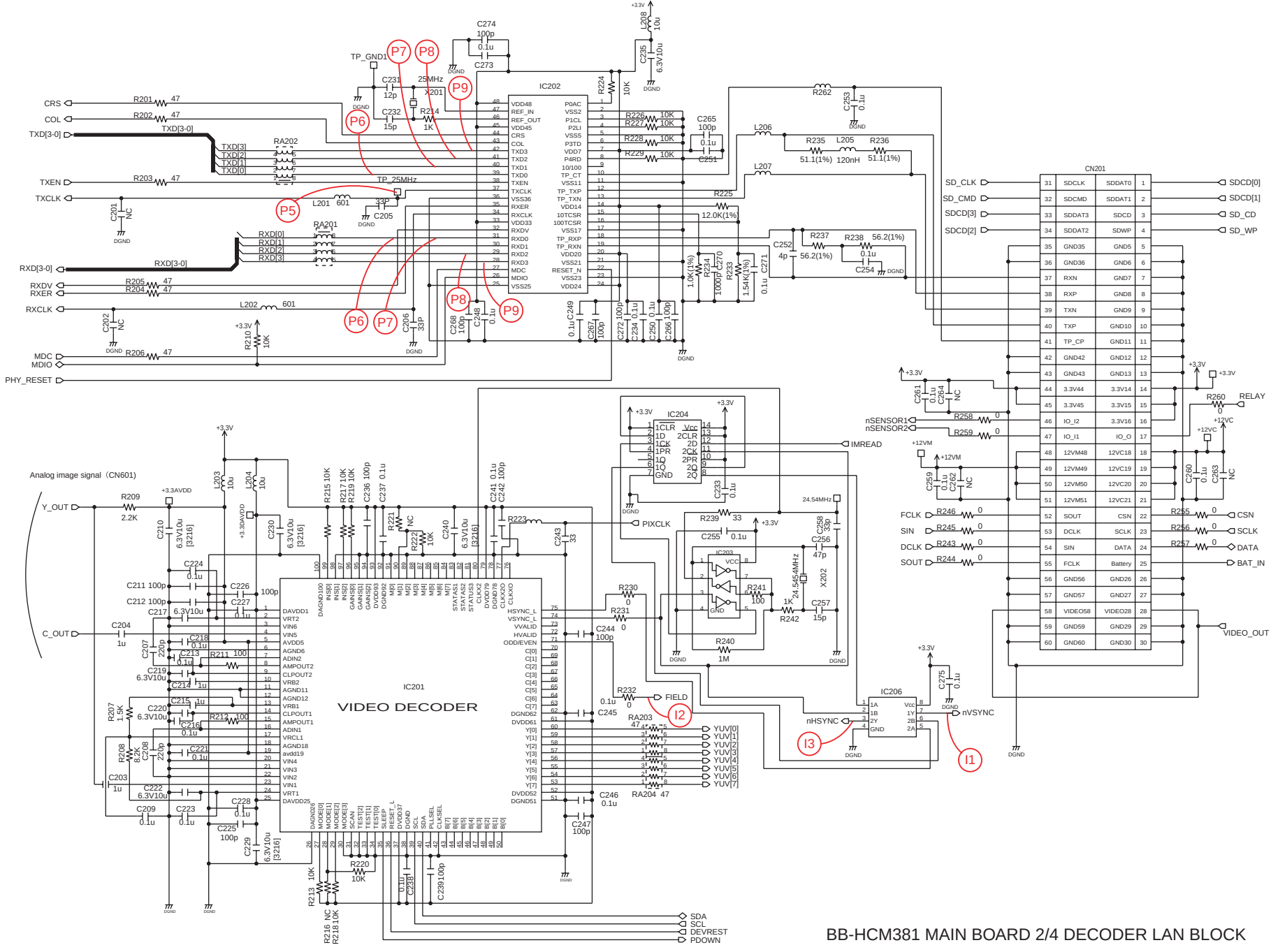


BB-HCM381 LENS BOARD 1/1 LENS CONTROL BLOCK

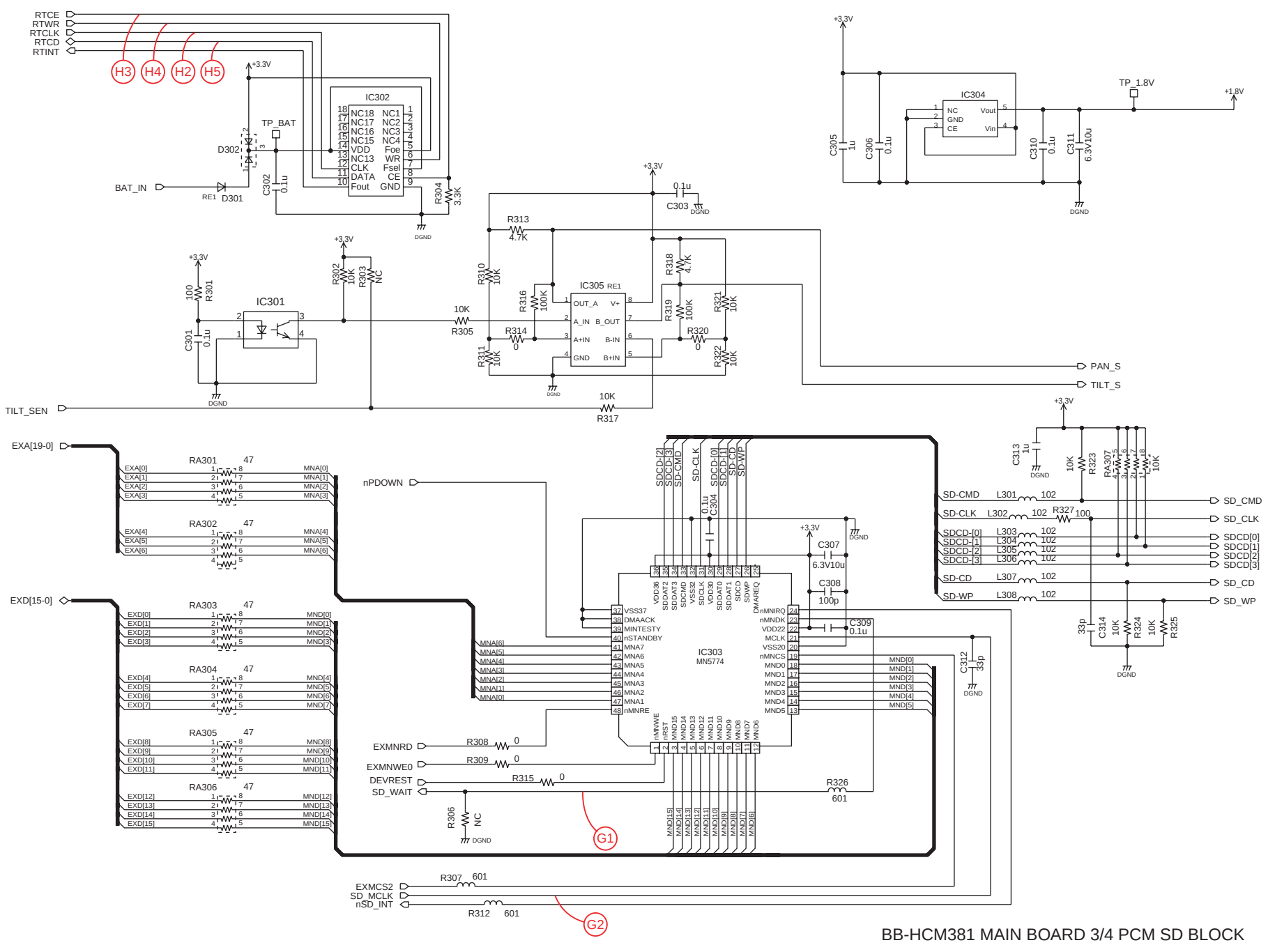


BB-HCM381 TILT BOARD 1/1 TILT & POWER BLOCK

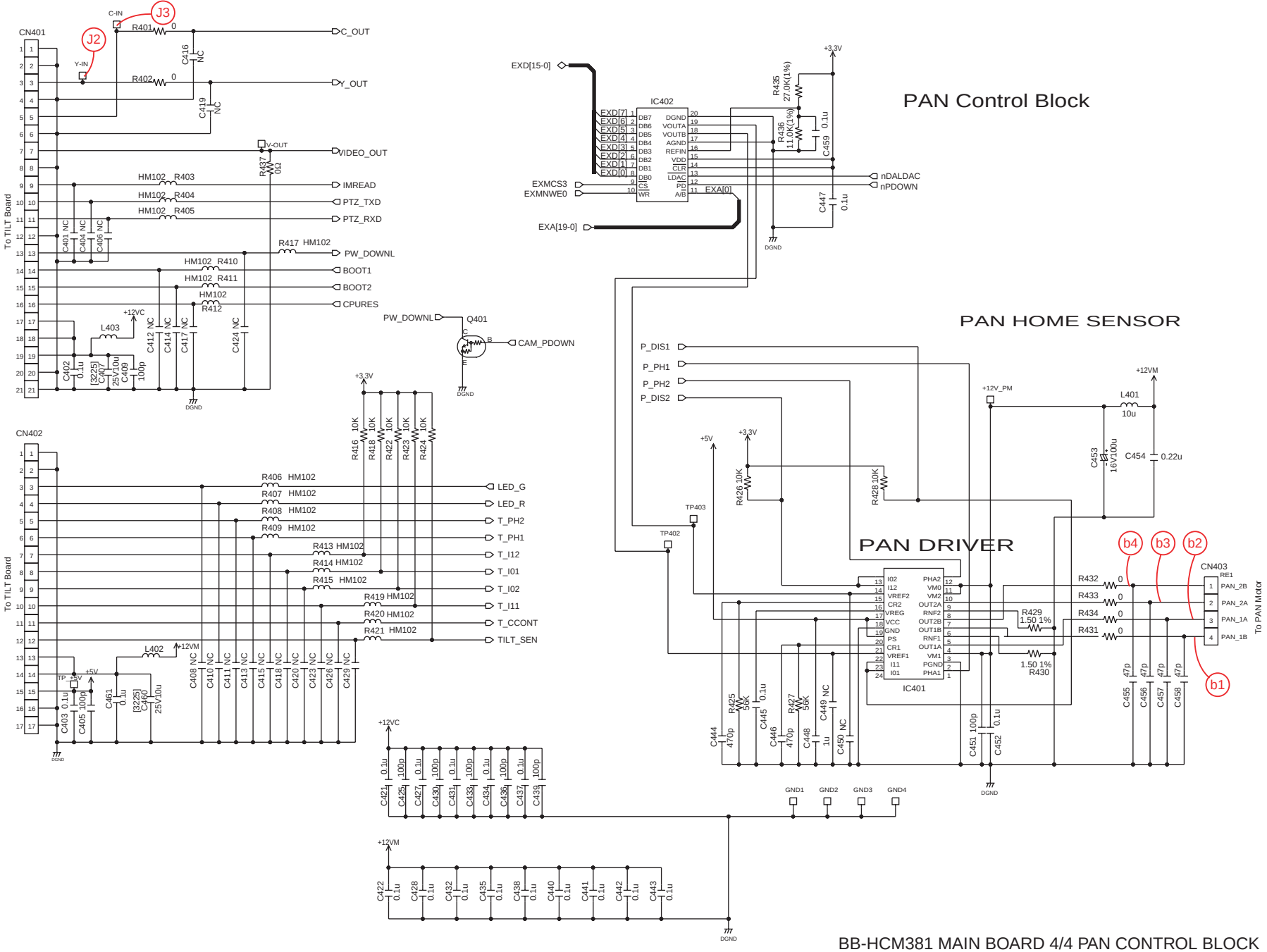

FLASH ROM
IC101
IC102
IC103
IC104
IC105
IC106
SDRAM
Q101
Q102
SW101
X101
L102
TP_GND3
TP_CS1
TP_RESET
TILT_S
FIELD
nVSYNC
nHSYNC
PIXCLK
YUV[7-0]
PDOWN
nPDOWN
T_CCONT
T_PH1
T_I11
T_I01
T_PH2
T_I12
T_I02
TRSTN
TDI
TMS
TCK
TDO
nSRESET
EXMCS3
EXMCS2
EXMNWE0
EXMNRD
SD_WAIT
nSD_INT
EXD[15-0]
EXA[20-0]
EXA[19-0]
TXD[3-0]
MDC
SD_MCLK
CRS
COL
RXD[3-0]
TXCLK
RXCLK
RXER
RXDV
MDIO
TXEN
SCL
SDA
SIN
P_PH1
P_DIS1
PTZ_TXD
PTZ_RXD
DEVRESET
FCLK
DCLK
SOUT
CSN
SCLK
DATA
RELAY
IMREAD
LED_G
LED_R
P_PH2
nSENSOR1
nSENSOR2
P_DIS2
nDALDAC
PAN_S
PHY_RESET
CAM_PDOWN
RTCLK
RTCD
RTCE
RTWR
RTINT
CPURES
BOOT2
BOOT1
O1
O2
O3
BB-HCM381 MAIN BOARD 1/4 CPU BLOCK



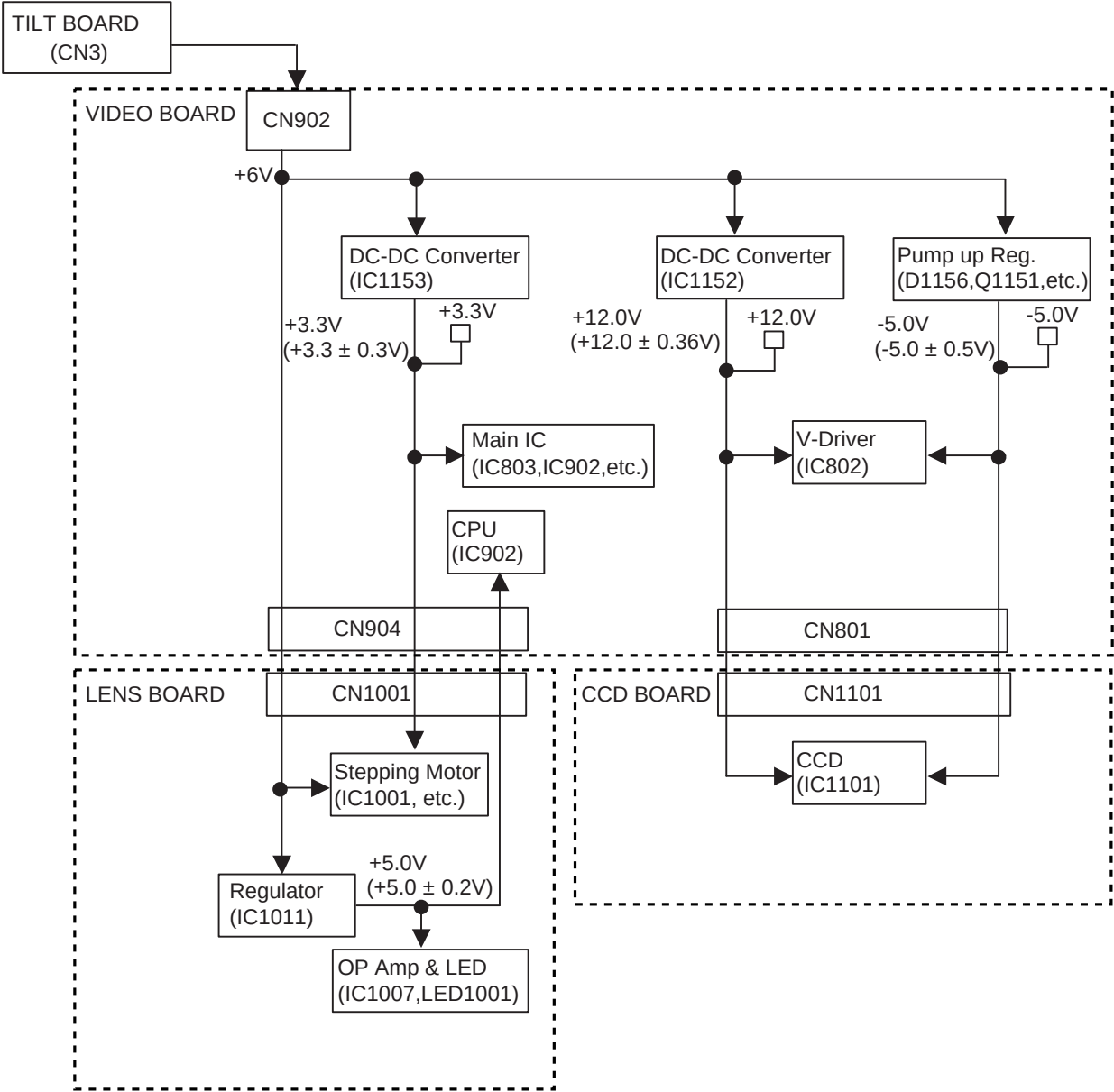
BB-HCM381 MAIN BOARD 2/4 DECODER LAN BLOCK

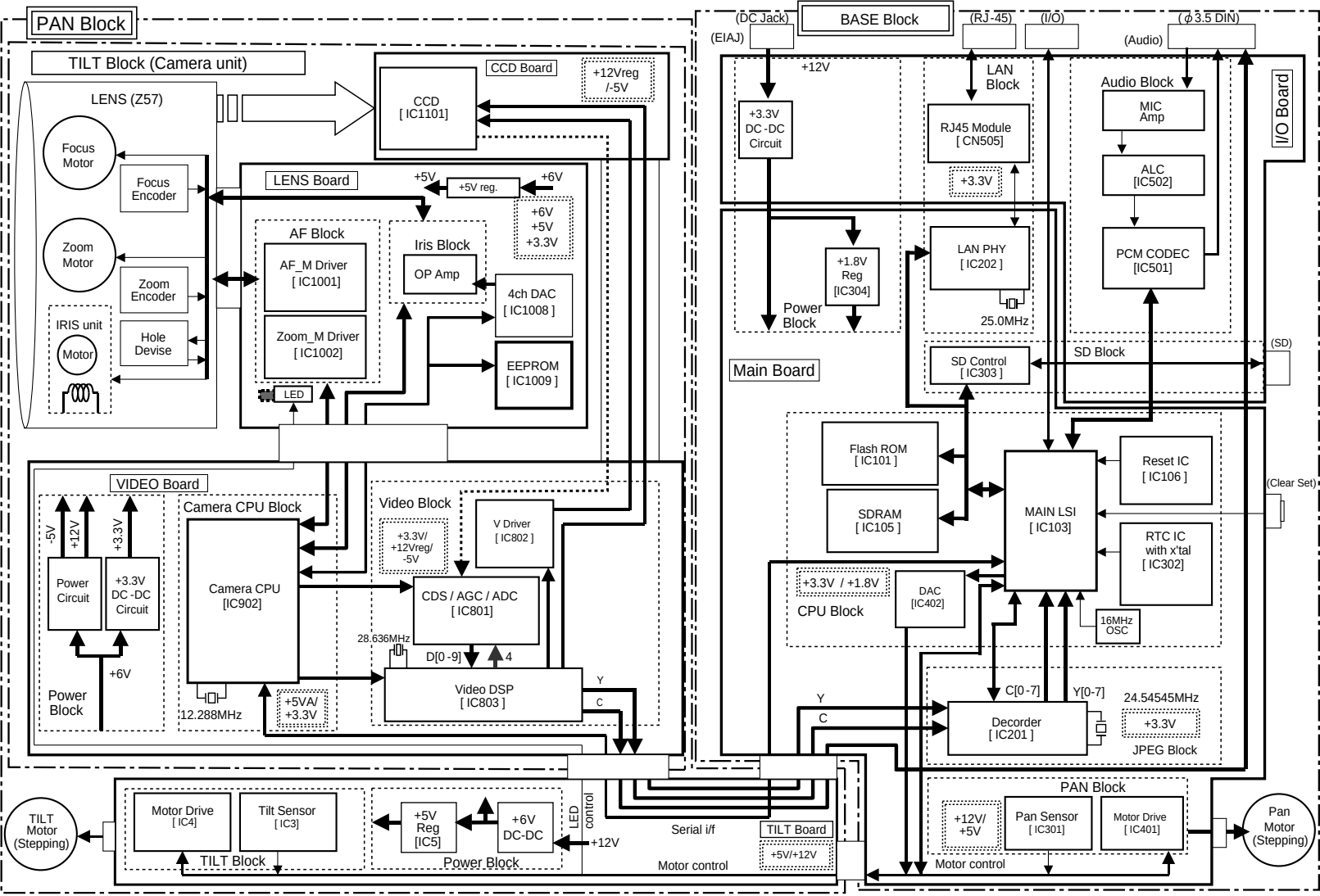


BB-HCM381 MAIN BOARD 3/4 PCM SD BLOCK



BB-HCM381 MAIN BOARD 4/4 PAN CONTROL BLOCK


TILT BOARD
(CN3)
VIDEO BOARD
CN902
+6V
DC-DC Converter
(IC1153)
DC-DC Converter
(IC1152)
Pump up Reg.
(D1156,Q1151,etc.)
+3.3V
(+3.3 ± 0.3V)
+3.3V
+12.0V
(+12.0 ± 0.36V)
+12.0V
-5.0V
(-5.0 ± 0.5V)
-5.0V
Main IC
(IC803,IC902,etc.)
V-Driver
(IC802)
CPU
(IC902)
CN904
CN801
LENS BOARD
CN1001
CCD BOARD
CN1101
Stepping Motor
(IC1001, etc.)
CCD
(IC1101)
+5.0V
(+5.0 ± 0.2V)
Regulator
(IC1011)
OP Amp & LED
(IC1007,LED1001)



BB-HCM381 BLOCK DIAGRAM